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NEW NAME, FOCUS FOR SOFTWARE EMANCIPATION

UpSpring to offer CodeRover development tools

BY ALAN ZEICHICK

Trying to shed its image as a company focused purely on the Fortune 1,000 market, Software Emancipation Technology Inc. this week restructured its company, reincorporated as UpSpring Software Inc., and introduced a new family of inexpensive development tools called CodeRover for individual programmers and their managers.

"UpSpring really is a new company," Bruce Boes, vice president of marketing, said of the change that took effect on Sept. 11. "There's little left from our 1995 origins as



There's not much left of the original company, says Boes.

Software Emancipation Technology, even from the way we did business two years ago. We have different management, different sales and support, different products and different customers. It's like a start-up called UpSpring bought Discover from Software Emancipation."

Discover is a suite of products aimed at helping enterprises find defects in large source-code bases as well as measure the quality of that source code against other large-scale software projects.

"We've been focused on the

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Inprise Unveils J2EE-Ready JBuilder 4.0

Java development suite to improve team collaboration, support XML

BY EDWARD J. CORREIA

Inprise this month is scheduled to release JBuilder 4.0, an update to its Java development environment. The new release adds support for J2EE Enterprise JavaBean development, will work with BEA Systems Inc.'s WebLogic application server, and has improved team collaboration features.

According to Tony de la Lama, Inprise's vice president of Java product development, JBuilder 4 will fortify enterprise functionality with support for Sun's JDK 1.3. New wizards will guide developers through the creation of Enterprise JavaBeans, EJB Groups, and entity and session beans. JBuilder also will automate the creation of IIOP stub code. And according to de la Lama, JBuilder will be the only shipping product that allows developers to debug Java Server Pages-based applications.

Team collaboration capabilities

will reportedly include a Web-savvy source code repository, which will enable remote debugging of components regardless of geographical location. The repository is also promised to feature a revision browser for viewing source history and analyzing and reconciling differences. According to de la Lama, JBuilder 4 adheres to the concurrent versions system (CVS), an open-source API for source code revision control.

In addition, the tools will offer XML editor and viewer support, XML presentation layer templates and support for JavaScript. Also included will be wizards for creation of Servlets and WebBeans.

JBuilder 4 also builds on its dbSwing data-aware JavaBeans, said de la Lama, by adding DataExpress, a series of predeveloped JDBC-compliant data-access components and source

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Don't Look Now: Linux Hits the Big Time

LinuxWorld attracts top vendors, over 20,000 attendees

BY ALAN ZEICHICK

SAN JOSE, CALIF. — Who says that Linux is a "movement"? As Austin Powers would say, "It's business, baby!" With huge booths from companies like Compaq, Dell, IBM and about 160 others, the latest annual LinuxWorld conference and exhibition, which was held here Aug. 15 to Aug. 17 and attracted 20,900 attendees, shows that although the kernel may be free, there's gold in them thar open-source hills.

One of the most interesting products demonstrated at LinuxWorld was Agenda Computing

Inc.'s palm-sized handheld computer. The Agenda VR3, expected to ship in October, is built not only on Linux 2.2.16, but also uses the X Window system to manage its 240-by-160 16-gray-scale display, and includes the ash and bash shells. The use of X rather than specialized embedded window managers, said Jack Brantley, director of marketing, makes it easier for Linux developers to port applications to the VR3 and its MIPS processor.

The VR3, which will be priced starting at \$149 for a system with a 66MHz processor, 8MB RAM and 2MB flash memory, also includes infrared and serial ports. The company is developing an initial suite of "palm" end-user applications for the system, said Brantley, and those applications will be released under the GNU General Public License simultaneously with the device.



The Agenda VR3 runs Linux 2.2.16 and the X Window system.

ALLIANCES

In his opening keynote, Michael Dell, chairman of Dell Computer Co., took potshots at both Microsoft Corp. and Sun Microsystems Inc., which he decried for being too wedded to proprietary solutions with Win-

dows and Solaris. Although Dell did not announce specific developer programs, he emphasized that his company has invested in many Linux-oriented start-ups, is increasingly offering Linux as an alternative to Windows on its desktops and servers, and will be moving toward offering services to help Dell customers configure Linux server applications on new systems. The key message, said Dell, was that Linux is going to be good for his company's business.

IBM Corp., never a company to be left behind, announced that it's snuggling up even closer to Linux mind-share leader Red Hat Inc. In a nonexclusive deal, Red Hat will be allowed to offer and sell all of IBM's Linux-based server applications, including DB2, Domino, Tivoli Framework and WebSphere. More important, Red Hat will be offering installation and configuration services for those applications running on top of Red Hat Linux. IBM will also be selling and

► continued on page 26

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Oracle iAS Targets Ready-Made Linux Constituency

Application server designed to leverage existing clients using open-source OS database

BY DOUGLAS FINLAY

With IBM Corp. set to bundle Linux with its AIX hardware servers, and industry vendors such as Hewlett-Packard Co. and Sun Microsystems Inc. having introduced a spate of new Linux products at last month's LinuxWorld in San Jose, Calif., Oracle Corp. moved quickly to retain its Linux constituency by unveiling the iAS Linux application server in August that features portal services, business intelligence tools and wireless applications.

Bob Shimp, Oracle's senior director of Internet platform marketing, said the number of downloads of its Linux database product—285,000 downloads in July—spurred the company to address and complete development of a Linux application server. "Being able to see market response made it clear what we needed to do on the application server side,"

he said. He added that the volume of downloads gave the company a "tremendous constituency of potential customers, because anyone who downloaded the Linux product was going to need an application server, and our new Linux application server is designed to run well with the Linux database download."

He said the market for the middle tier, or application server space, is strong right now, noting the new entries from HP, IBM and others. But he took exception to IBM's portrayal that it addresses complete Linux concerns, instead saying that IBM had its higher-end, sophisticated AIX processing systems in mind and was likely pushing its hardware platform as much as it was pushing Linux. Still, he suggested that because Microsoft is not likely to release a Linux version of its

SQL Server database, "Oracle and IBM will be the main players to watch on the Linux server side."

The iAS server offers three basic features designed to speed overall development of Web sites, maintain customer information and transmit it to wireless devices. Portal Services utilizes the application server to build Web sites without the need for developers to use additional software. "It can create libraries of portlets," Shimp said, "or snippets of HTML that contain data sources, which are assembled into personalized sets of individual Web pages based on the portlets." He said portlets were being designed by many third-party independent software vendors to put into libraries, such as news and weather, and enterprise resource planning and customer relationship management (CRM) applications.

Shimp said business intelligence tools built into the iAS would further help developers discern customer and employee behavior about purchase habits and usage of Web pages. "That kind of data is better used rolled up into knowledge using business intelligence tools and data warehousing," he said. The built-in tools would integrate with the company's report systems to enable users to mine the material to understand customer behavior. Shimp claimed that Oracle was the first Linux application server to come to market with the CRM package.

Finally, Shimp said a wireless edition of the server could perform screen scraping, or extract information from a portal to convert it into a wireless application for display on cell phone screens or PDA devices. "The net result is that developers can create an

application once, put it on a portal and output it to any wireless devices."

Oracle's iAS Linux application server, available in standard, enterprise and wireless editions, is available immediately, and uses Oracle's new "power unit" pricing model, in which the price is calculated by multiplying the number of processors by the processor clock speed to achieve a "power unit," and then multiplying again by a multiple specific to each product. In this case, the multiple is \$5 for the standard edition, which includes the HTTP Server, Apache Jserv, Perl Interpreter, Portal Services, Oracle JSP and Oracle LDAP Developer's Kit; or \$30 for the enterprise edition, which adds Oracle Cache, Oracle 8i/SQL, Forms Services, Reports Services, Discoverer Viewer and Enterprise Manager with console and management server. ■

INFORMIX GOES UNDER THE KNIFE

Database firm downsizes staff, consolidates product line

BY DAVID RUBINSTEIN

In the wake of two consecutive disappointing quarters and a stock price languishing near its all-time low, Informix Corp. is taking decisive action.

Informix (www.informix.com) will consolidate five business groups into two—a database operation and a solutions operation—according to Peter Fiore, the Informix senior vice president who will head the solutions operation. As a result of the consolidation, Fiore said, the company will eliminate 500 jobs from its 4,300-person work force, a 12 percent reduction. Fiore said the jobs will come primarily from finance and administration, and duplicative marketing operations.

"What you'll see is a bottom-up analysis of our entire business," Fiore said. "We'll focus on fewer initiatives and phase out products to migrate our existing customers to newer technologies in a transitional way. At the end, we'll invest more in growth opportunities and less in areas where we're not seeing the return."

Fiore blamed the company's poor performance on

growth opportunities that were missed because of the amount of segmentation that existed within Informix, and said the consolidation will provide more focus and resources in areas where growth potential exists. For the second straight quarter, which ended June 30, the company failed to meet earnings estimates.

On July 13, the company changed its top-shelf lineup, as Peter Gyenes took over as CEO from Jean-Yves DEXMIER. DEXMIER had blamed the company's stagnation on its shift in focus from its core database business to an Internet infrastructure.

The company announced it will take a one-time restructuring charge in the third quarter in the range of \$75 million to \$90 million. Additional charges will be taken through the first half of next year, but should result in an annualized cost savings of \$70 million to \$80 million. The company's stock price, which had reached as high as 21 1/4 in April, closed at 4 5/8 on Aug. 15. Gyenes also announced the company will buy back 6.4 million shares of

its stock, which he perceived to be greatly discounted at its current price level.

The company's database division will continue to provide products such as Internet Foundation 2000 and Cloudscape.

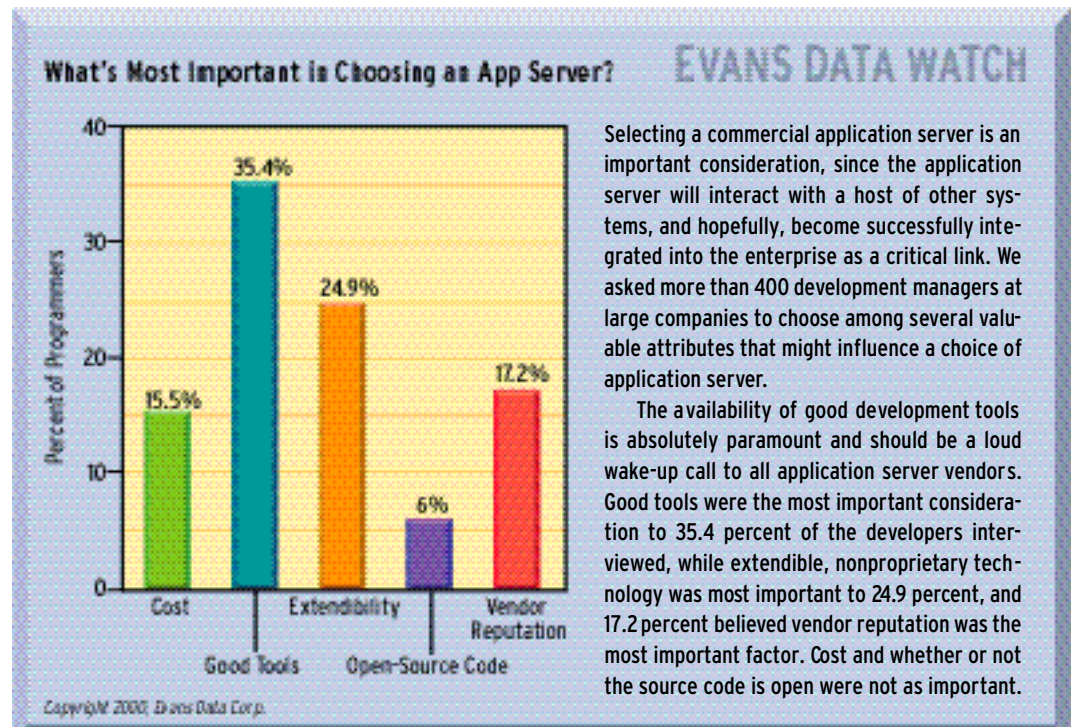
On the solutions side, Fiore said Informix will move to position itself as a provider of tools

to create the infrastructures to support enterprise portals by offering its Media360 content management application, the Ardent DataStage database management tool set and iSell, a suite of applications for e-commerce. Fiore acknowledged that Informix is refocusing its application suites to take advantage of the growth in the "e-business platform" space, on which businesses build and deploy Web-based applications.

Fiore, who also will head cor-

porate marketing at Informix, joined the company as part of the acquisition of data-integration tools maker Ardent Software Inc., which was completed in March. Senior vice president Jim Foy, who also came over in the Ardent acquisition, will head up the database division.

Chase Securities Inc., which tracks Informix, is maintaining its buy rating for the company for investors "with a large amount of patience and a long-term investment horizon." ■





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Caldera to Acquire SCO's Software, Services Divisions

New company to create a common API for Linux, Unix

BY EDWARD J. CORREIA

To say that Linux is on the rise has officially become an understatement. Linux developer Caldera Systems Inc. last month announced it will acquire the software and professional services divisions of The Santa Cruz Operation Inc., currently the world's largest supplier of Unix. One of the first orders of business for the newly combined company will be to create an API common to both Caldera Linux and SCO UnixWare.

Under terms of the agreement, Caldera (www.caldera.com) will form a new holding company, Caldera Inc., 28 percent of which will be transferred



SCO's software will fuel Caldera's growth in Linux, says Tamang.

to SCO in the form of 17.5 million shares of Caldera Systems' common stock and \$7 million in cash. SCO will retain its Tarantella division and the rights to SCO Server intellectual properties, and continue to receive 55 percent of future revenues from its sales. SCO will change its name to Tarantella Inc., with Doug Michaels remaining as CEO of the renamed company.

Benoy Tamang, vice president of strategic development, said that the acquisition will catapult Caldera into a world-class operating-system supplier. "What we're going to get is a massive amount of small- to medium-sized businesses and a very fast-

growing OEM customer base that have been looking to get into Linux, but that we have not had the bandwidth to accommodate," he said. The deal is expected to close in October, and will expand Caldera's employee ranks from around 200 to nearly 800, Tamang said.

Tamang said that prior to the acquisition, SCO had been looking to supplement its core enterprise-class server business with a Linux offering, and even considered releasing its own Linux version. Now, Caldera will use SCO's products to represent the "brick and mortar" part of the business and to "fuel the growth and make sure Linux is successful in the future."

As part of the move to bring commonality to the two operating systems, Caldera plans to develop an Open Internet Platform (OIP), which Tamang described as a layer to sit atop Linux and Unix permitting developers to create applications for either operating system. A working release of the OIP is scheduled for December with pricing to be announced. ■

PictureTaker Distributes Software to Windows Me

LANovation Inc. has updated its software-distribution tools to accommodate Microsoft's Windows Millennium Edition operating system, the successor to Windows 98.

The company's flagship product, PictureTaker Enterprise Edition 3.1, allows developers to package an application and distribute it to hundreds of desktops, often without requiring reboots or even disturbing the end user, according to the company. It bypasses the software's normal installation procedure to copy new or changed files, as well as update registry keys on the Windows client directly, the company announced.

According to LANovation (www.lanovation.com), the new version 3.1 release not only adds support for Windows Me, but also enhances the product's support for Windows NT/2000 by merging changes to Windows' environment and registry variables without removing existing values, thereby making it easier to use PictureTaker in heterogeneous environments where each target PC's configuration might be slightly different. According to LANovation spokesperson Kristina Halvor-

son, the base license for PictureTaker Enterprise Edition is \$2,000 for the first 100 deployment seats, although the target market for the product is networks with 500 or more clients.

Another change with PictureTaker Enterprise Edition, said Halvorson, is that the product suite includes the functionality in LANovation's Conflict Checker product. Conflict Checker evaluates a software deployment to identify potential Windows registry and file problems prior to deployment.

The company has also updated its lower-end software-deployment product, PC Updater, to support Windows Me. PC Updater is a subset of PictureTaker, according to LANovation, which offers developers less flexibility in tuning the specifics of the installation process, and does not include the Conflict Checker functionality. PC Updater is targeted at smaller organizations, and is priced at \$1,000 for a minimum 100 seats.

LANovation also offers an OEM version of PictureTaker, licensed to help shrink-wrapped software developers create installation procedures for their products. ■

BEA, NOKIA SERVERS MERGE

Combining its Java-based WebLogic servers with Nokia's Wireless Application Protocol (WAP) Server, BEA Systems (www.bea.com) has developed the WebLogic M-Commerce Solution to provide access to WAP-compliant wireless applications on such wireless devices as cell phones, handheld computers and pagers.

By writing applications in the WebLogic Commerce Server or the WebLogic Server to the Wireless Markup Language, the applications can then be ported to the WAP server by Nokia (www.nokia.com) and distributed to mobile wireless devices. Scott Dietzen, chief technology officer for BEA Systems, said the combination of the WebLogic servers with Nokia's WAP server would transform simple content delivery to wireless devices into a more sophisticated transaction-oriented service.

The M-Commerce Solution is available immediately for \$6,200 per developer. ■

News Briefs

COMPANIES

Starbase Corp. and **WebGain Inc.** will integrate WebGain's IDE Studio with Starbase's collaborative code and content change management tool set for the creation of e-business development projects. The offering will allow application developers and content providers to work together in a common IDE to create scalable, dynamic applications, the companies said. . . . **Tower Technology Corp.** has licensed the Java 2 Platform, Standard Edition from **Sun Microsystems Inc.** and will release a compatible version of its TowerJ virtual machine later this year. Also, Tower has become a participant in the Java Community Process. . . . **Telelogic AB** has acquired **QSS** in a \$115 million deal to strengthen its position in the real-time application development market. QSS developed the DOORS requirements management suite, while Telelogic Tau is the company's real-time development environment. . . . **eGrail Inc.** has released the kernel of its content-management utility to the open-source community. It will be available at www.egrail.org. . . . **Dr. Dobb's Journal** is offering an online education program through an alliance with the University of California. Dr. Dobb's Community University offers courses in C++, Java and Visual Basic programming, among other topics. A course syllabus and enrollment information can be found at www.ddj.com/university. . . . **Stack Overflow** has announced a new name—**Mozquito Technologies**—which it said will better identify customers to its most visible brand, **MOZQUITO TECHNOLOGIES** Mozquito Factory, a suite of Web development tools based on XHTML, which adds XML functionality to HTML via a Forms Markup Language.

PRODUCTS

IBM Corp. and its subsidiary **Lotus Development Corp.** have made available a **WebSphere/Lotus Domino** bundle for collaborative Web applications. The bundle is expected to sell for \$9,999. With a "getting started" package of setup and configuration services, it will be \$10,995. . . . **Halcyon Software Inc.** is making its **Instant ASP (iASP)** Active Server Pages framework available for free to users of Cobalt Networks Inc.'s RAQ3 server hardware. iASP is a Java implementation of Microsoft's ASP technology. It can be integrated with application servers from BEA, IBM, iPlanet and Oracle. . . . **ParaSoft Corp.** has integrated its Java and C++ testing tools, **Jtest**, **Insure++** and **CodeWizard**, into **WebKing**, its Web application development and testing tool. By integrating the tools into WebKing, developers can test Web applications containing back-end programs written in C++ and Java. WebKing 2.0 is available for Linux, Solaris and Windows and is priced starting at \$3,495. . . . **RSW Software Inc.** has released **EJB-test 2.2**, which it claims is the only tool for



testing the scalability and functionality of Enterprise JavaBean-based middle-tier applications. Significant

enhancements include advanced session bean support, dynamic graphing capabilities and extended functional testing. A typical configuration is priced beginning at \$20,000. . . . **FMS Inc.** is shipping **Total Visual CodeTools 2000**, a suite of 12 tools and utilities for developers using Visual Basic, Microsoft Office/Access 2000 or working on any Visual Basic for Applications platform. The three major categories of tools are Code Cleanup, for standardizing existing code; Code Delivery, which allows developers to number the lines of code for error detection; and Code Builders, which the company said helps developers write code more quickly. Total Visual CodeTools 2000 is licensed on a per-developer basis, with a single license priced at \$299 and a five-license package priced at \$899.

PEOPLE

Software AG Inc. has appointed **Klaus Fittges** as chief technology officer, to oversee the company's XML initiatives. Fittges joined the company in 1998 as head of the development team for Tamino. . . .



Dr. Michael Aivazis has joined Pasadena, Calif.-based start-up **Cleanscape Inc.** as vice president of engineering. Previously, Aivazis was director of technology at **ParaSoft Corp.**. . . . Embedded software developer **eMation** has named **Paul F. Henderson** vice president of business development and strategic marketing. Henderson will join eMation from **Avid Technology Inc.** ■

IBM Offers Design Patterns for E-Business Applications

BY DAVID RUBINSTEIN

IBM Corp. is doing its part to ease the programmer shortage with the publication of Patterns for e-business—a set of best practices that IBM says will help companies design and

implement different scenarios for transacting business over the Internet.

Patterns, which is produced in CD-ROM format in the context of IBM's Application Framework for e-business, is an

aggregation of successful development and deployment experiences harvested from more than 20,000 IBM customer experiences, according to IBM's director of e-business marketing, Scott Hebner, who claims that

the knowledge set will allow enterprises to complete up to 80 percent of the architecture of new e-business systems.

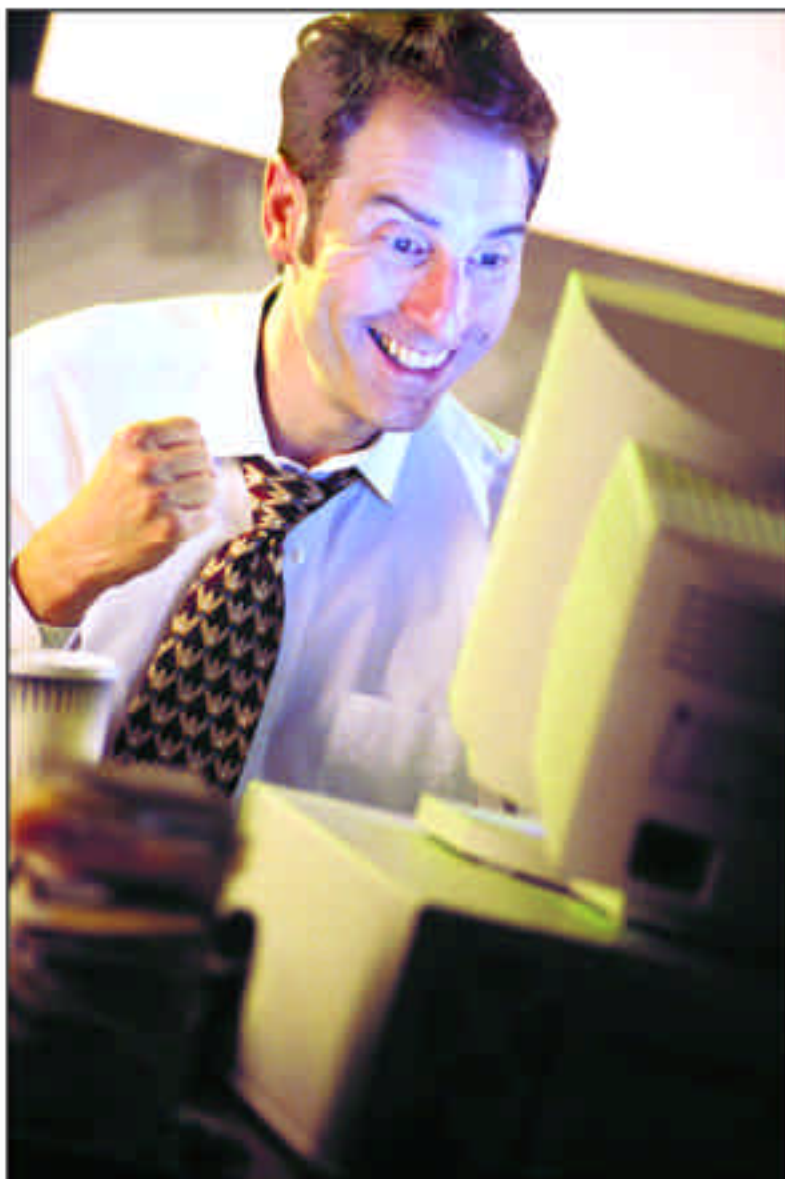
"Our customers have been telling us that skill shortage is a problem," Hebner said. IBM's

Patterns series, he said, will allow businesses to focus on their own unique value-added business-specific programming, without having to build systems from the ground up.

The first six Patterns cover the areas of user to business, user to online buying, business to business, user to user, user to data and application integration. Each of the CDs also includes evaluation copies of IBM development tools, such as DB2, VisualAge for Java and WebSphere Studio—all of which can be utilized in the Patterns framework.

Hebner said IBM expects to be able to deliver toolkits and code to install with later releases of Patterns. The current releases are available at www.ibm.com/framework/patterns.

As another part of IBM's effort to address the skills shortage, Hebner said, the company will offer certification for e-business developers, which will include in-depth testing for knowledge of designing applications as well as making sure that businesses learn to use open standards in conjunction with one another. ■



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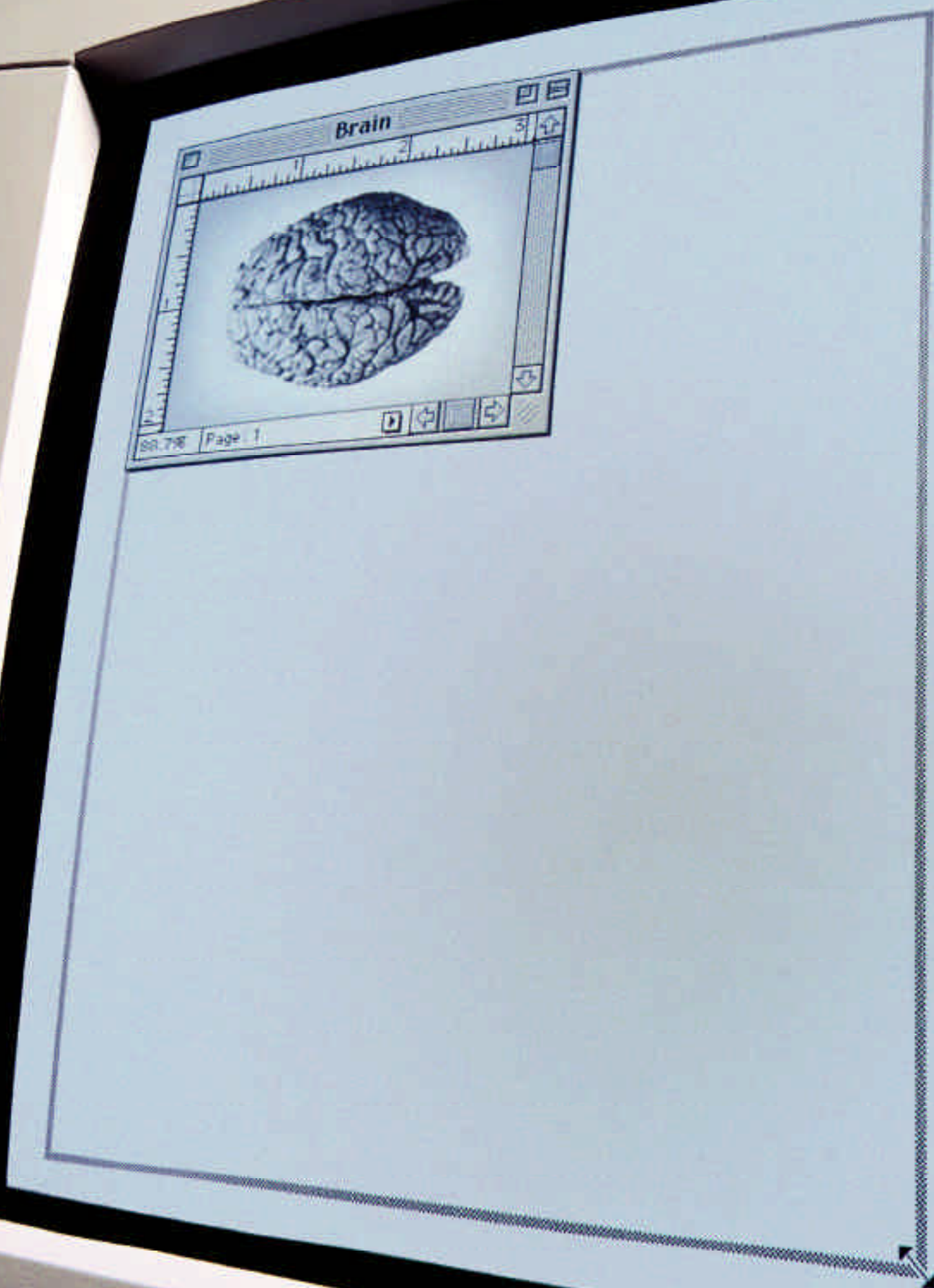
Rational Beefs Up IBM IntelliStation

Rational Software Inc. has taken its enterprise suite of development tools and integrated it with IBM Corp.'s IntelliStation workstations, extending a partnership between the companies that began in June 1999.

Rational Suite Enterprise is made up of 10 tools, including Rose and the Unified Process, that cover project management, software development, content development and defect tracking. The suite will be preconfigured and preloaded in the IntelliStation E Pro workstations. Together, the release will allow developers, project managers and engineers to build complex applications faster, claims Glenn C. Hughes II, director of strategic alliances at Rational (www.rational.com).

Hughes added that by year's end, all versions of the Rational suite—AnalystStudio, DevelopmentStudio, PerformanceStudio and TestStudio—will be preloaded and preconfigured on the IntelliStation.

The workstation is based on Windows NT and is available starting at \$2,974. Licensing fees for the Rational suite are separate. ■



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TIBCO LOOKS LONG TERM WITH EXTENSIBILITY PURCHASE

Company also debuts RVTX real-time messaging system for Linux, Windows

BY DOUGLAS FINLAY

Tibco Software Inc.'s recent purchase of Extensibility Inc. for stock worth \$100 million is designed to help Tibco build

new XML technologies necessary for developing next-generation automated applications such as declarative integration, which will integrate into the enterprise.

In purchasing Extensibility (www.extensibility.com), Fred Meyer, Tibco's chief marketing officer, said that over the past two years XML has become a

key strategy to EAI. Calling application integration a complex process involving several tuning parameters, including the transport protocol used, the security

measures used, the process and document formats used as well as the legal and business issues involved, Meyer said providing infrastructure services for such integration would best be solved by doing it in an automated, organized and well-thought-out manner. "If you don't automate," he said, "you'll be in a bad position because there's no regularity of structure to things that are coded by hand."

In search of a pure XML technology base to complement its own integration technologies, Meyer said Extensibility fit that need because the company "lives, works, eats and breathes" XML. "These guys know every flavor there is of XML," he said, "and they sit on committees such as OASIS [Organization of Advancement of Structural Information Standards] and W3C [World Wide Web Consortium]."

He said the fit with Extensibility would enable them to be at the forefront of what he called declarative integration, "where you might be able to take your GUI and have a data interface, or a way to represent metadata for each system being worked on, or a way to represent business rules in XML or UML [Unified Modeling Language], and actually tie them all together to enable a user to create services on-the-fly, much the way business people use spreadsheets today."

In addition, Tibco (www.tibco.com) released Rendezvous TX (RVTX) in August, a multithreaded real-time messaging system. Designed to work with Linux, Unix and Windows NT/2000, RVTX provides real-time communication between Tibco's ActiveExchange and ActivePortal applications. Developers can integrate other applications into the RVTX messaging system using adapters sold by Tibco, or an RVTX software development provided by the company. RVTX is an update to Tibco's previous messaging infrastructure, Rendezvous.

When used with Cisco Systems Inc.'s Pragmatic General Multicast-compatible network routers, the RVTX protocol also performs real-time multicasting, in which broadcast messages travel as a single message through the routed network, only breaking into individual messages when reaching the router closest to their destination.

Available immediately, RVTX pricing begins at \$30,000. ■



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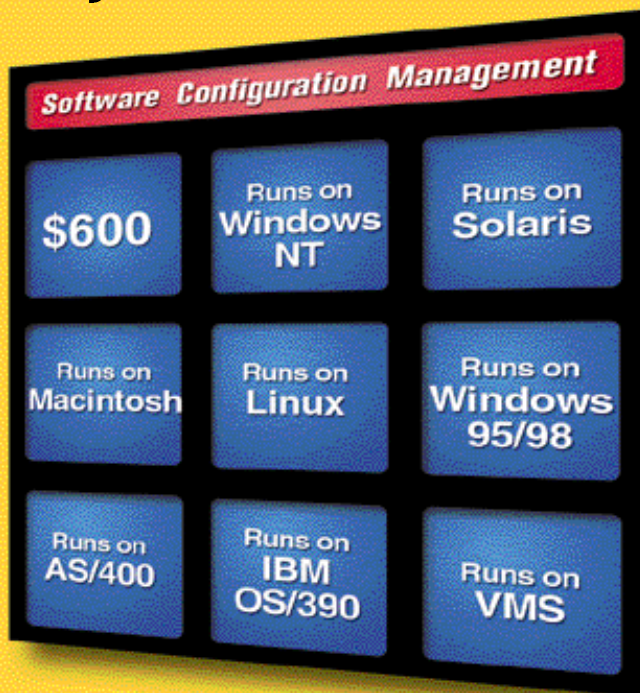
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OMG Works on Mapping to C#

BY DAVID RUBINSTEIN

The Object Management Group Inc. is expected this week to release an RFP for the standardization of a language mapping between CORBA-enabled applications and Microsoft's new C# programming language.

"It's pretty clear cut," said OMG's, technical director, Andrew Watson. "There's a CORBA specification and a C# specification. We need mapping so C# developers can use features in CORBA products." The mapping will let applications written in C# interface with applications written in C, C++, Java, Ada, COBOL and other languages via CORBA, the OMG's object request broker architecture.

C# was targeted for the language mapping because, Watson said, Microsoft will ship a lot of development kits for the .NET platform based on C#, and developers must be able to work with applications written in a wide variety of languages. "If you're integrating whatever .NET turns out to be into your real systems, they'll need to talk to things like CORBA," he said.

The RFP was expected to come out of the OMG's Technical Meeting Week, held this week in Burlingame, Calif. Once the document goes out, members will have the opportunity to respond to it before it is adopted as a specification.

Bob Marcus, CTO at Rogue Wave Software Inc., an OMG (www.omg.org) member company, said Microsoft is making a big push with the .NET platform, and that the Java 2 platform is being widely adopted, so it is important for all the technology to work together. "It's time for software vendors to not pick favorites," said Marcus. "It's interesting theater, but from a customer perspective, bashing each other is disastrous."

Marcus said Rogue Wave supports OMG's decision to consider a CORBA-to-C# mapping, but hopes it is done for the right reasons. "We want OMG to take a look at it not to satisfy academic concerns, but to answer, 'Does it give value to the customer?'" ■

ObjectSpark Maps Objects to Relational Databases

BY DOUGLAS FINLAY

What does a developer do when faced with having to save multiple object elements in a Web shopping cart—to a relational database, for instance? Perhaps take a studied look at Ontos Inc.'s new ObjectSpark mapping tool that automatically generates transactional components and saves and stores them into relational databases such as IBM's DB2 and Microsoft's SQL Server.

"Many developers are struggling with taking components in a pure object-oriented environment and having to write tedious code lines to store them in a relational database, rather than having an object database to store them in," said Greg Cornellier, vice president of engineering

at Ontos (www.ontos.com).

According to Cornellier, in developing ObjectSpark, the company found patterns that enabled it to take an object model and a relational model and map how developers want those objects to be saved. "If I write customer.save, what does that mean in terms of SQL?" Cornellier asked. "Am I going to a customer table, or am I going to a client table?" With ObjectSpark, he said the developer can work out those particulars.

The program follows the simple philosophy of what Ontos calls Cap-Map-Gen, or capture, map and generate, to enable the program to capture objects to a relational database. He said the program automatically generates all defaults so developers don't

have to start from the beginning. "Within three to five minutes, they can take an object class, have it mapped and decode database against it," Cornellier said.

He said that on the object side, ObjectSpark supports aggregation, composition and association, adding that programmers can describe a composite relationship one way in the database, and an association yet another way. "But it's all done through the mapping exercise."

Once mapping is complete, a validation step is activated to check that nothing's been missed, protecting run time. However, if a mistake is caught, it simply throws out a warning. "It's easy to forget a step. If it's missed, the developer recaptures the model, hits reassign

and all the work is saved and regenerated."

Once validated, code is generated or compiled in C++. "We create the C++ code, compiling it using C++ATL templates, and what's created is a DLL [Dynamic Link Library] in the COM." Cornellier called the program MTS (Microsoft Transaction Services) aware.

Cornellier said future ObjectSpark releases will generate components in both Java and Enterprise JavaBeans.

ObjectSpark is expected to be available Sept. 15 and consists of three pricing models. The Entry Level Edition is \$900, while the \$1,800 Professional Edition adds an XML server and Data Reporter. The Enterprise Edition, which includes extensive mainframe capabilities to the Professional Edition package, is priced at \$10,000. ■

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Software Support ROI	\$1.5B
Software Development ROI	\$1.5B
Software Marketing ROI	\$1.5B
Software Distribution ROI	\$1.5B
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Software Patch ROI	\$1.5B
Software Bug Fix ROI	\$1.5B
Software Feature Request ROI	\$1.5B
Software User Feedback ROI	\$1.5B
Software Customer Satisfaction ROI	\$1.5B
Software Retention Rate ROI	\$1.5B
Software Churn Rate ROI	\$1.5B
Software Lifetime Value ROI	\$1.5B
Software Acquisition Cost ROI	\$1.5B
Software Marketing ROI	\$1.5B
Software Sales ROI	\$1.5B
Software Support ROI	\$1.5B
Software Development ROI	\$1.5B
Software Marketing ROI	\$1.5B
Software Distribution ROI	\$1.5B
Software Maintenance ROI	\$1.5B
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Software Integration ROI	\$1.5B
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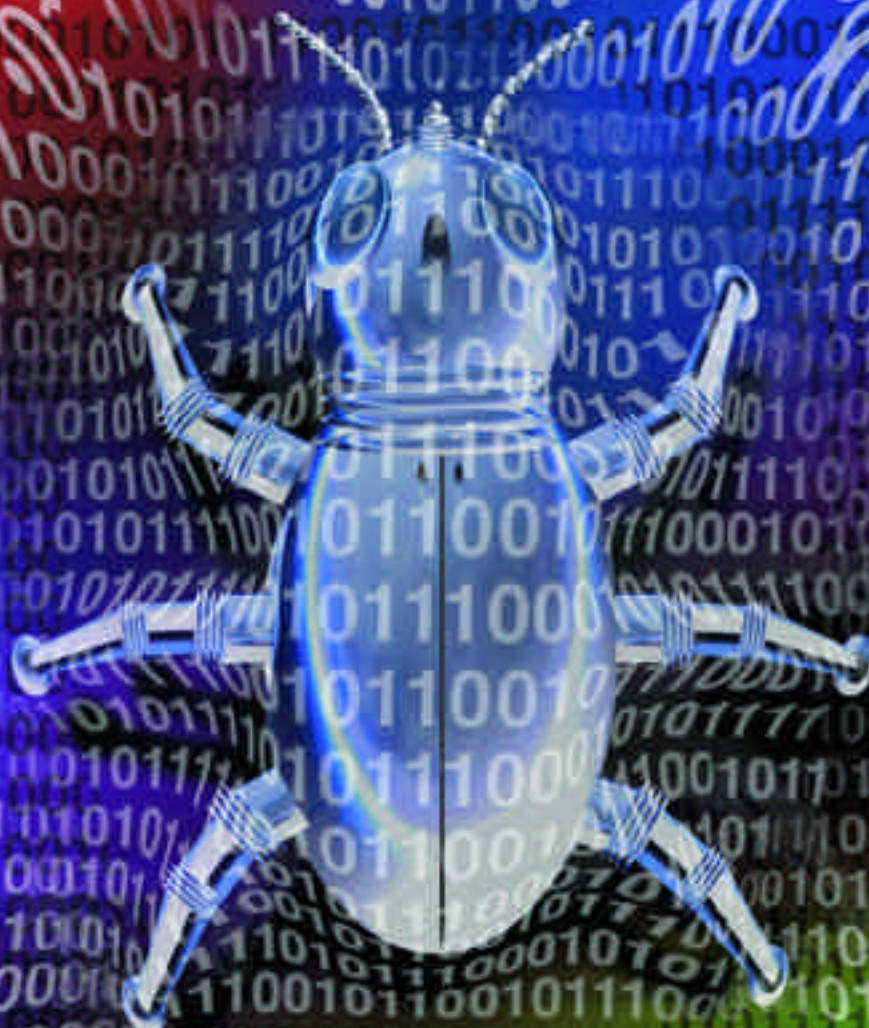
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Tracking Defects by Hand

TeamTrack Mobile lets Palm users pilot databases

BY EDWARD J. CORREIA

TeamShare Inc. has released TeamTrack Mobile, a system that permits users of its defect tracking and knowledge base products to access and manage the databases in real time from any handheld device running the Palm OS.

TeamShare develops and markets tShare, a defect tracking system for software development teams; and tSupport, a knowledge base and call tracking system for technical support teams. Both products are accessed through ordinary Web browsers, which now includes those for Palm OS.

"People who have Palm [devices] are in love with them and are always looking to do other things," said John Keller, product manager at TeamShare. Keller said that mobile capabilities were a feature commonly asked for by TeamShare customers. "A large portion of a developer's job is spent away from their desk going to meet-

ings," he said. "But with TeamTrack Mobile, they can still have access to real-time data, keeping their project up-to-date, and keeping themselves on track."

Databases can be accessed in two ways, either through a

browser in real time—which requires a modem and an SSL-compliant Palm browser—or through synchronization. According to Keller, real-time database access from a Palm browser includes all the capabilities of a desktop brows-

er, including the ability to create and modify fields and add or delete users. Data in the systems' ODBC-compliant stores are converted on-the-fly to dynamic HTML depending on the type of browser detected.

Synchronization takes place through the Palm Desktop client software and ScoutWare from wireless solutions company Aether Systems (www.aether-software.com). Newly assigned

tasks appear in the Palm to-do list, and updates to existing tasks are uploaded to the database.

Pricing for TeamTrack Mobile, which supports Microsoft IIS or Netscape Internet Server, starts at \$120 per registered tTrack or tSupport user. Per-seat pricing for tTrack starts at \$599, for tSupport at \$1,199. A 30-day trial version is available at www.teamtrack.com/products/ttrack/eval.htm. ■

ESPIAL JAVA TOOLS FREE FOR ALL

On the heels of a deal to include its Java developer's tool suite in an Intel StrongARM reference platform, embedded tools maker Espial Group Inc. now has decided to offer developer's versions of its Architect IDE and Espresso GUI environments for free to all, beginning with new versions released last month. The company will still sell OEM versions of the development tools to device builders.

"It is strategically important for a Java company such as ourselves, [that] Java technology be successful," said Mal Raddalogo-

da, senior director of strategic marketing at Espial (www.espial.com). "If we've got a Java community we can point to for our service providers and device customers that will allow them to get new applications developed, that's strategically important."

The company's OEM partners currently pay \$750 per developer seat for the tools, plus a royalty for each device sold. Included in the price is DeviceTop, an application launching environment necessary for a device to operate on its own. DeviceTop also includes client-side application deployment

and management capabilities.

Although the DeviceTop environment will be absent in the free developer's version, a DeviceTop emulator will be included and will permit developers to test applications as if they were installed in a device running the environment. The free tools also will include Architect 3.0, a rapid appli-



List of device emulators includes this smart phone.

cation development environment for Java, and Espresso 3.2, which provides a small-footprint graphical user environment for Architect applications. Together, the tools can be used to create stand-alone, royalty-free Java applications. According to the company, the Espresso environment adds only about 175KB to Architect applications.

Espial's tools and device emulators are now available for download at www.device-top.com. ■

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MontaVista CDK Hits Many Targets

Embedded Linux developer MontaVista Software Inc. has released the Hard Hat Cross Development Kit (CDK), a set of tools for Linux and Solaris hosts that the company claims offers developers the broadest selection of embedded targets available.



The CDK supports about 24 targets, says MontaVista's McMullen.

According to the company, developers can use the tools to target multiple board and reference designs based on x86/Pentium, Motorola/IBM PowerPC, NEC MIPS and Intel StrongARM microprocessors. Host machines include x86-based computers running Red Hat Linux version 6.1 or 6.2; Apple PowerPC, G3 and G4 and IBM RS/6000 machines

running Yellow Dog Linux from Terra Soft Solutions Inc.; and on Sparc stations running Solaris.

"The message is that we've got incredible breadth and depth in architectures, and not just one board each," said Kent

McMullen, vice president of marketing at MontaVista (www.mvista.com), emphasizing the tools' support for multiple designs within each architecture, which he said totals roughly two dozen boards.

McMullen said that source code for some of the supported architectures and boards uses a prerelease version of the forthcoming Linux 2.4 kernel, and will feature a serial interface to target devices.

In addition to GNU open-source compilers and utilities, the CDK is bundled with other development tools, including the Microwindows GUI; ViewML, the newly released MontaVista embedded browser; and Hard Hat Net, a compact PCI backplane interface for intradevice communications. ■

Green Hills Ports IDE To Hitachi SuperH

Adding to a long list of supported processors, Green Hills Software Inc. has released a version of its Multi 2000 integrated development environment for Hitachi SuperH processors running its own ThreadX RTOS. The IDE supports the entire SuperH family, including the SH-1, 2, 3 and 4, as well as the SH-DSP and SH3-DSP models with integrated digital signal processors.

The U.K.-based Green Hills (www.ghs.com) develops embedded solutions for 32- and 64-bit processors, including its ThreadX and Integrity royalty-free real-time operating systems, which are integrated with the tools.

According to the company, the updated IDE features a C/C++ compiler that is specifically optimized for the SuperH architecture, including support for the ability of the SH3-DSP to execute four independent operations per instruction. Debugging capabilities include an integrated memory viewer, incremental debugging, and error-checking at processor and system levels.

Available now, Multi 2000 is priced at \$5,900 for Windows hosts and \$8,900 for Unix. ■

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Apogee to Port Java Tools to Hard Hat Linux

Just days after IBM announced that it would create a version of its VisualAge Micro Edition Java integrated development environment for MontaVista's Hard Hat Linux, another Java tools developer—Apogee Software Inc.—has followed suit. The company is working on a version of Aphelion, its embed-

ded development and deployment system that will support IBM's PowerPC 405GP embedded microprocessor running Hard Hat Linux.

According to the company, Aphelion will initially be available as a graphical IDE for Windows hosts, with a command line interface for Sun

Solaris. The first release reportedly will include PersonalJava and EmbeddedJava VMs that have been ported by Apogee (www.apogee.com) for PowerPC, MIPS and x86 embedded processors. Eventually, these VMs are to be replaced by enhanced ports of Sun's Connected Device Configuration

and Connected Limited Device Configuration VMs for the Java 2 Micro Edition specifications, with enhancements by Apogee to include compliance with the Real-Time Specification for Java, the report said.

According to the company, the Windows version of the integrated development environment will present the look and feel of Microsoft's Development Studio tools, and will include byte code optimizers and byte code/native debuggers, as well as a compiler that can convert native source code or byte code into binary code. ■

SINGH TO CHAIR LINUX BODY

Inder Singh, CEO of LynuxWorks Inc., has been elected chairman and president of the Embedded Linux Consortium, a not-for-profit organization designed to promote the use of Linux in embedded applications.

The consortium's board of directors, which itself was placed in July, filled its five executive positions last month. Dan Bander, business line manager of IBM's Pervasive Computing



The ELC lets Linux competitors work together, says chairman Singh.

group, was elected to the position of vice chairman, Greg Wright, an IT consultant from Sydney, Australia, was elected vice president; and Jim Ready, founder and CEO of MontaVista Software Inc., was given the post of treasurer. Murry Shohat, a marketing consultant and executive director of the ELC, was elected secretary.

"The ELC has matured quickly," said Singh. "Within the consortium, we can all work

together to help position Linux as the preferred embedded operating system and grow the embedded Linux market even as we compete." Singh is a 25-year computer industry veteran with 12 years in the embedded industry, and has served on more than a dozen boards.

The consortium, which held its first meeting in March, now consists of 96 members and will next convene at the Embedded Systems Conference in San Jose, Calif., the week of Sept. 25. Membership in the vendor-neutral ELC (www.embedded-linux.org) is free to developers who prove participation in the Linux open-source code base. ■

Peerless to Offer Novell Source Code

Novell Inc. has entered into an agreement with Peerless Systems Corp. to distribute the source code of the Novell Embedded Systems Technology (NEST) Office SDK, a set of tools that assist OEMs with embedding networking in their devices, enabling them to share and remotely manage those products on Novell networks. The agreement marks the first time Novell will permit a third party to distribute and license its intellectual property.

Peerless (www.peerless.com), which helped Novell develop the NEST Office 1.0 SDK in 1997,

has broadened the solution to encompass MacOS, Novell, Unix and Windows environments and will distribute the source code to manufacturers and offer development support.

The NEST Office SDK 1.0 contains source code for the Novell-developed embedded NetWare client 3.1 and the NDS clients for NetWare 4.x and 5.x, security software developed by RSA Security Inc., and printing and application support by Peerless. Giving OEMs the source code allows them to build their own sets of custom product features. ■



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EDITORIAL

Linux Is No David

Linux has gone mainstream, both as a deployment target and as a development platform. Look at the number of top-shelf vendors supporting the operating system with nearly the same enthusiasm as they offer for Microsoft's Windows 2000. When you include all the major hardware manufacturers, few today would call a decision to use Linux "risky."

That feeling permeated the latest LinuxWorld conference, held mid-August in San Jose, Calif. Although there was a lack of neckties, it was not very different from any other trade show and exhibition, except for the number of young people sitting around on the floor, leaning against any available vertical surface, coding as fast as their hands could work their notebook keyboards. The feeling of being a movement, of plotting world domination, was missing, other than adulation for people like Linus Torvalds or Jon "maddog" Hall. The religious fervor for the open-source concept has been replaced with, well, capitalism.

That feeling became evident when talking with business leaders in the Linux community. Robert Young, chairman of Red Hat Inc., told us that he views the world as divided into three segments: servers, personal computers and high-end embedded systems, in particular Internet appliances.

As Young believes that Linux has now proven itself, his company isn't worried about gaining market share *within* the Linux market. Rather, he's looking upward at the entire operating-system market. "We're targeting Microsoft and, to a lesser extent, Sun," as well as embedded vendors such as Wind River, he said, citing the benefits of a single operating system integrated end to end.

Volker Wiegand, president of SuSE Inc., also no longer sees Linux as an up-and-coming operating system. "We have left the stage where Linux has to prove itself. It *has* proven itself," he said, referring to its large and increasing market share in not only the Web server market, but on general-purpose business servers as well. "It's not the David anymore," he said, adding that "Linux is beginning to enter the mission-critical space."

WHICH LINUX?

But while Young focuses his development and marketing resources on attracting Windows NT/2000 and Solaris customers, Wiegand's SuSE and the other Linux distributions are faced with the unenviable task of differentiating their products.

Few, if any, of the Linuxes have done a good job of explaining why their bundle with the 2.2.16 kernel is really better than someone else's CD-ROM containing the same kernel and packages. The Linuxerati, perhaps, understand the subtle differences between Debian GNU/Linux and the Red Hat offerings, or between Gnome and KDE. Nobody else does. Or cares.

It's a tough choice. It's hard to see how many Linux distributions will be able to survive unless they differentiate. Yet if they change their products too much, they risk fragmenting the Linux market, and maybe the operating system, too. Ultimately, despite the minor technical differences among the Linux distributions, it may all come down to support policies, marketing, partnerships and alliances, and branding—not technology, innovation or rampant open-source fervor—which will determine which of these Linuxes will remain commercially viable. ■

GUEST VIEW

PROCESS INTEGRATION ORIENTED APPLICATION INTEGRATION

Data and application interface oriented application integration is the science of integrating numerous applications and data stores so that they benefit one another within a trading community or within an enterprise. This is more traditional application integration and typically occurs at the information level, by simply exchanging data between systems housed in different trading partners, or perhaps allowing systems to share common methods. Typically this means defining information flows at the physical level, not taking into account abstract business concepts such as shared agreements and processes, which are becoming critical for application integration (EAI or B-to-B).

Up until now, what was missing from the application integration mix has been the notion of process integration. Process integration is the ability to define a common business process model that defines the sequence, hierarchy, events, execution logic and information movement among systems residing in the same organization (EAI) and systems residing in multiple organizations (B-to-B). For the purposes of this Guest View, we'll focus on the B-to-B domain.

Process integration is a strategy, as much as a technology, that strengthens your organization's ability to interact with internal applications and trading partners, by integrating entire business processes, both within and between enterprises. Indeed, process automation delivers application integration by dealing with several organizations using various metadata, platforms and processes. Thus, process integration technology must be flexible, providing a translation layer between the source and target systems, and the process integration engine. Moreover, process integration technology needs to work with several types of technologies, including message-oriented and transaction-oriented middleware.

Process integration is the science and mechanism of managing the movement of data, and the invocation of processes in the correct and proper order to support the management and execution of common processes that exist in and between organizations. Process integration oriented application integration provides another layer of easily defined and centrally managed processes that exist on top of an existing set of processes and data contained within a set of trading partner applications or within an enterprise.



DAVID
LINTICUM

WHAT IS PROCESS INTEGRATION?

Process integration oriented application integration is best defined as applying appropriate rules, in an agreed-upon logical sequence, in order to pass information between participating systems, as well as visualize and share application level processes, including the creation of a common abstract process that spans both internal and external systems. This definition holds true regardless of whether or not the business processes are automated. For example, processing an insurance claim, or delivering a car to a customer, are business events that can be automated with process integration oriented application integration.

Say there are three companies that participate in a trading community: companies A, B and C. Company A produces parts for skateboards, while Company B assembles and tests the skateboards, and finally, Company C sells the skateboards. They all have their own set of processes that are native to the respective companies, and their internal systems, a production system, an assembly system and a sales system, respectively. Up until now, automated integration has been nonexistent, and mail and fax serve as communications between companies.

In order to integrate these applications, the trading community has decided to implement process integration oriented application integration, defining a common process

model that spans all companies and internal systems. This process model defines a sequence and logical order of events from the realization of consumer demand, the purchase of raw materials, creation of the parts, assembly of parts into a product, product testing and, finally, the sale of the products to the ultimate consumer. This common model integrates with local systems by having visibility into their internal application processes, if possible, or perhaps through more primitive layers, such as the database or application interface. What's important is that the common process model is able to produce events that are understood by the systems participating in the process, as well as react to events that the applications communicate back to the process integration engine.

The use of a common process model that spans multiple companies for application integration provides many advantages, including:

- The ability to create a common agreed-upon process between companies automating the integration of all information systems to react to business events such as increased consumer demand, material shortages and quality problems in real time.
- The ability to monitor all aspects of the business and trading community to determine the current state-of-the-process in real time.
- The ability to redefine the process at any given time in support of the business, and thus make the process more efficient.
- The ability to hide the complexities of the local applications from the business users, and have the business user work with a common set of business semantics.

THREE MAIN SERVICES

To this end, there are three main services that B-to-B process integration provides: the visualization of processes contained within all trading partner systems, interface abstraction and the real-time measurement of business process performance.

By visualizing enterprise and cross-enterprise processes contained within trading partners, business managers are able to become involved in

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PROCESS INTEGRATION

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enterprise integration. The use of graphics and diagrams provides a powerful tool for communications and consensus building. Moreover, this approach provides a business-oriented view of the integration scenarios, with real-time integration with the enabling middleware or points of integration. This provides business analysts with the ability to make changes to the process model, implement it within the trading community and typically not involve the respective IT departments.

There are three types of processes to visualize: internal, communitywide and specialized processes.

- Internal processes exist at the intracompany level, providing the business user with the ability to define common EAI processes that span only systems within the enterprise, and are not visible to the trading partners or communitywide processes. For example, the process of hiring an employee may span several systems within the enterprise, but should not be visible to processes that span a trading community, or other organizations for that matter.

- Communitywide processes exist between companies, and consist of a set of agreed-upon procedures for exchanging information and automating business processes within a community.

- Specialized processes are processes created for special requirements, such as collaboration on a common product development effort that only exists between two companies, and has a limited life span.

Interface abstraction refers to the mapping of the process integration model to physical system interfaces and the

abstraction of both connectivity and system integration solutions from the business analyst. Process integration exists at the uppermost level in the B-to-B middleware stack. Those that use process integration tools are able to view the world at a logical business level and are not limited by physical integration flows, interfaces or adapters. What's more, the middleware mechanisms employed are also abstracted, and are not a concern of the business process analyst, as long as the common process model is interacting correctly with all source and target systems that exist within all companies.

Although each process integration tool and project may take a slightly different approach, the internal process of interacting with the physical systems typically consists of the following set of events:

1. Source system that exists inside a company posts an event to the process integration engine—for instance, a skateboard is sold.

2. The event is transformed, if required, so the event adheres to a standard set of business semantics and information processing mechanisms (synchronous vs. asynchronous). This is going to be engine dependent, but there always has to be a common set of process semantics and information processing mechanisms defined at the engine level so the analyst can make sense of a business process that spans many types of applications, platforms and databases.

The process integration engine reacts to the event, once transformed, invoking other processes in other systems to support the execution of the common B-to-B process model. For instance, if a skateboard is sold, it then sends an order to the skateboard assem-

bler, posting an event from the process engine to the assembler's target system, typically over the Internet.

3. Based on receiving that event, the local system reacts as per its internal processes and posts an event back to the process engines (say, when the skateboard is assembled).

4. The common process model sequences the master process, sending and receiving other events in support of the common B-to-B process model. This is an ongoing activity with information moving up to the process engine from the local systems, transformed if required, and down from the process engine to the local systems in support of the execution of the process model.

Another way to view the process of creating a process integration model is defining the hierarchy of processes within the trading community. This means that smaller subprocesses can be linked at the lower tier of integration, or are native to the source or target systems. Building up from the lower-level processes to the higher-level processes, you may link the subprocesses into higher-level processes within the domain of the trading community.

The measurement of business process performance provides the B-to-B process integration with the ability to analyze a business in real time. By leveraging tight integration with the process model and the middleware, business analysts are able to gather business statistics in real time from the trading community—for instance, the performance of a supplier in shipping goods to the plant, and the plant's ability to turn those raw materials into product.

Moreover, the process integration provides the technology user with the ability to track

and direct each instance of a business process—for example, processing individual orders or medical insurance claims, through a life cycle that may consume seconds, minutes, hours, days or weeks. Finally, we need to measure and maintain contextual information for the duration of a process instance that spans many individual activities.

MOVING FORWARD

The question remains, "How will the next-generation process integration oriented application integration tools and technology add value to a typical trading community or EAI?" As businesses rapidly change over time, the need for a flexible information movement and integration infrastructure increases, moving from the information to the process level. While state-of-the-art application integration solutions, such as message brokers, provide flexible solutions today, a tremendous amount of work still remains to be done to bind systems together at the back end. Every time things change, similar "plumbing" work must be repeated. Process integration oriented application integration will provide the ultimate in flexibility because you, the user, will no longer have to address these issues of "plumbing" with most of the complexity abstracted from you. Clearly this notion will define application integration moving forward. ■

David S. Linthicum is CTO of Saga Software and the author of several books on enterprise application integration, including the forthcoming "B2B Application Integration: Approaches, Techniques, and Technology to e-Business-enable Your Enterprise." He can be reached at david.linthicum@sagasoftware.com.

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NEW THIS MONTH

We've made a few changes to our editorial lineup. Beginning with the Sept. 1 issue, Evans Data Corp., a market-intelligence firm specializing in software-development technologies, agreed to provide SD Times with highlights of its current research results. Check out page 5 of this issue to see what development managers look for when choosing

an application server.

Also new this month, we are joined by Larry O'Brien, who is familiar to many of you as the founding editor of Software Development Magazine. A prolific programmer, writer and speaker, and currently working as a consultant, Larry will be sharing his insights in Web Watch, which in this issue appears on page 33.

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Paying too much for J2EE[™] technology is a little dinghy



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Java Fast-Forwards Enterprise Development

BY LISA MORGAN

Java is quickly becoming the language of choice for developers who are building enterprise and mission-critical applications. Sun Microsystems Inc. claims there are 2.5 million Java developers today, and International Data Corp. (IDC) estimates that the number of Java developers will exceed 4 million in 2003. Some developers are migrating to Java because it's portable. Others say it enables quick time-to-market. And last, but not least, some developers are migrating to Java in hopes of landing a better job elsewhere.

Developers agree that e-business is driving the need for a solution such as Java. Java's "write once, run anywhere" capabilities save developers a great deal of porting time. In addition, applications can be configured and updated dynamically—another time advantage.

Uniscape Inc. (www.uniscape.com), an application service provider (ASP) that provides internationalization and localization services and manages a related developer community, is using Java because it's fast and flexible. According to Howard Schwartz, vice president of marketing, Java solves a lot of problems with language and cultural diversity, which speeds time-to-market for Uniscape and its customers.

"Java is helping us execute in Internet time," said Schwartz. "We can develop solutions for multiple platforms and languages much more rapidly than we could in C or C++. Increasingly, our customers want their Web sites to be locally relevant, which means evoking the proper language and encoding it for the target territory. I'd say Java cuts our development time by 50 to 70 percent."

Kim Sheffield, general manager of SilverStream Software Inc. (www.silverstream.com), a provider of software and services, said his customers are choosing Java because it's stable and reliable.

"The average [Web] site is a lot more sophisticated these days," said Sheffield. "Today, developers are being asked for capabilities like content man-

agement, work flow, personalization, XML integration, rules and engines. Our customers are interested in getting these Web sites deployed as quickly as possible. Sixty days is about the average."

For Hewlett-Packard Co.'s customers, 60 days is also a normal time-to-market window. This need for speed is compounded by the rapidly changing nature of e-business. "A new company might start out doing one thing and then be doing something completely different nine months later," said Ram Appalaraj, director of marketing for HP's business-critical computing group. "You need a component-based architecture to manage that level of change. The business climate is very competitive, and you never know when your innovation is going to be pre-empted by the competition."

"You don't have to be a rocket scientist to use Java," said John Pompeii, CTO of Secant Technologies Inc. (www.secant.com), an application server provider. "Unlike C++, you don't have to worry about code-level [mistakes] like threading. Instead, you can use components to rapidly adapt software to business changes. Java [also] addresses the



ROI concerns a lot of [CTOs and development managers] have. It enables us to rapidly build applications so we can get to market fast. That's the name of the game these days."

THE PRODUCTION LINE

According to Pompeii, C++ developers are migrating to Java because they can be three to five times more productive. A May 1998 study published by IDC stated that projects built with the Java language, targeting the 100% Pure Java standard, yielded an average of 25 percent savings when compared with C++ for development projects requiring multiple platform deployment. Coding phase savings were even more dramatic, averaging nearly 40 percent, the report said.

Peter O'Kelly, a senior consultant and analyst with the Patricia Seybold Group, agrees that Java development may be faster than C or C++ development, but he is hesitant about quantifying the time savings because the matter is "too complex."

"Java is generally considered to be conducive to higher developer productivity than C++," he said. "C++ is arguably too low level in many respects.

[For example,] developers end up doing their own memory management."

Secant's Pompeii said that all of his C++ developers want to migrate to Java, which is leaving him concerned about future C++ resources. And although his developers may want to develop in Java, not all may be equally suited to server-side application development.

"There's an art to server-level development," he said. "You can't read a book and do it right the first time. A developer can be writing JSPs [Java Server Pages] in a couple of months, but the development of server applications requires more experience. If a [server application] developer doesn't have Java experience, I look for two to 10 years of experience with object-oriented technology and CORBA expertise."

Java hasn't killed C or C++ yet, nor, in the opinion of those interviewed, do most developers think it will in the short-term, despite Java's popularity. There are many applications written in C or C++ that are performing their intended tasks just fine. As a result, some shops are taking the "if-it-ain't-broke-don't-fix-it" stance. Others maintain that C++ is better suited to complex or highly specialized applications than Java is because developers can have a greater level of control. Also, Java requires a Java Virtual Machine (JVM), and C++ doesn't require a VM, which means that C++ can also run in environments where a JVM is either not available or not wanted.

JAVA: NOT THE PERFECT BREW

Developers are quick to point out that Java is an excellent solution, but certainly not a perfect one.

"Java is the best thing in the history of computing to date, but it's still not there," said SilverStream's Sheffield. "J2EE [Java 2 Enterprise Edition] may bring 'write once, run anywhere' to servers but that does not preclude write once, test everywhere. Sure, the differences between platforms may be slight, but they're still there."

Other developers interviewed agree: If you're not testing Java implementations on all target platforms, you're being naive. Java's portability is the main attraction for enterprise-



Java cuts development time by up to 70%, says Uniscape's Schwartz.



Sites have to be up quickly, says SilverStream's Sheffield.

JAVA

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level developers whether or not they actually need that capability today. Although multiplatform environments are common, there are still single-operating-system shops that are developing apps in Java so they can be ported to other platforms in the future. In the case of Windows, this may represent some trade-offs of portability vs. tight integration and exploitation of the operating system's functionality.

"Java is not as sophisticated as ActiveX controls in a Windows environment," said Neal Goldman, director of Internet computing strategies at the Yankee Group. In other words, Windows developers may find themselves choosing between portability and functionality.

Microsoft is attacking Java head-on with its new .NET strategy, which features improvements to the basic C++ language and introduces a new language called C#. The improvements to C++ enable developers to migrate existing C++ applications to the .NET Framework, as well as make any class created in C++ accessible to any other Visual Studio language, which means classes created in one language may be inherited by another. Further, memory management now supports garbage collection, like Java.

C# is an object-oriented language that is designed to expedite the development and migration of C and C++ applications. It also supports garbage collection and is interoperable with COM+ services. Like Java, it also supports XML.

IBM Corp. adopted Java on the basis of portability. According to Scott Hebner, director of e-business marketing, IBM saw a distinct evolution from operating-system-centric applications to Internet applications, and Java was the way to go.

"The question at the time was, what programming model will prevail?" said Hebner. "We realized if we wanted our customers to leverage the Internet that we needed an open programming model."

IBM has made significant investments in Java. The company now supports 35 platforms using Java, including AIX, AS/400, Linux, S/390, Windows 2000 and even a personal communicator operating system. Some of its most popular products, including MQ Series and DB2, are based on the Java programming model.

"Java is a safe bet for enterprise application development; in fact, it's becoming a requirement now," said Hebner. "There are new business processes that exploit the Internet as opposed to just connecting one point to another. Now there are interdependencies among e-markets, auctions [and] supply-chain management, and you have to be able to control that sort of environment. You need run-time, static binding and garbage collecting capabilities, which Java has and C++ does not. You need to be able to configure applications dynamically and integrate partners using open standards."

THE ABC'S OF BEA AND JAVA

John Kiger, BEA Systems Inc.



John Kiger is the director of product marketing for BEA Systems Inc.'s E-Commerce Server division. He spoke recently with SD Times about Java and the role it plays in Web application development and deployment.

SD Times: Do you think e-business is driving the need for Java in the enterprise?

John Kiger: Absolutely. That's why BEA is focused on providing a [Java] platform for business-critical and e-commerce solutions end-to-end. All BEA products are Java-based.

What kind of solutions do you offer?

We provide an application framework that developers can use to build dynamic applications using servlets and JSPs [Java Server Pages]. We also offer application, transaction, personalization and commerce servers so companies can Internet-enable their businesses. Lastly, we provide tools that enable customers to connect to processes. You need to connect or extend out to the supply chain e-commerce platforms with process integration and collaboration tools.

What are the benefits of Java, in your opinion?

There are a lot of great things about Java. It's an open standard and it's OS independent, which is very attractive to our customers. It's easy to learn and takes care of a lot of programming tasks for you. Developers can be a lot more productive with it, and there are lots of tools now. There's also a groundswell of support.

What do you think are the most important of those features?

Higher productivity and reusability. The half-life of applications is shorter these days. With Java, you can take components and reuse them in future generations of products and evolve only those components that need updating. You can also develop applications for one market segment and then make modifications for another market segment.

How does Java differ from other languages?

For one thing, it's the first application platform that's Internet native and designed for building Internet applications. It's easy to develop applications

that find and deliver information and services, which is what the Internet is all about. Static Web pages are dead. Using Java tools like JSPs, JHTML and servlets, you can create and deliver dynamic content.

You said the language was built for the Internet. How does that play out for developers who are building e-business applications?

Java is a very comprehensive platform that utilizes a component model. Developers don't need to know about lower-level stuff like networking, databases and transactions. That means developers can focus on business applications rather than infrastructure.

What about security? Is Java secure in your opinion?

Java is very secure. It's a distributed application platform that protects systems from remote system breaches. ActiveX and COM have that problem. Java also integrates emerging [security] standards like SSL [Secure Sockets Layer] and PKI [Public Key Infrastructure].

—Lisa Morgan

IN THE MIDDLE

Some developers are using Sun's J2EE middleware capabilities to link legacy systems to midtier servers on which the business logic resides. Secant's Pompeii thinks J2EE's middleware functionality is especially useful for shops that are building applications that have large client loads.

"Java has changed a lot over the years," said Pompeii. "At first, it brought 'write once, run anywhere' capabilities, which meant you didn't have to rewrite applications. J2EE brings that kind of portability to the enterprise and server-

side components. The enterprise side is the exciting part for distributed object middleware community."

IBM's Hebner also underscores the importance of middleware functionality.

"When you build an enterprise application that involves messaging and transactions, you need to build it to a standard," he said. "In Java, you can write to EJBs [Enterprise JavaBeans] rather than to environment-specific APIs. With Java you also get portability of business logic and application services."

Several of Secant's customers are

using Secant's J2EE solution to build mission-critical applications. Some are building Web systems, while others are developing vertical solutions, such as a biology framework for DNA and gene analysis, and an energy provisioning system.

"C++ is faster and more efficient than Java for certain applications, but it requires five times more experience," Pompeii said. "Generally speaking, C++ code is really complex, and it requires a greater ramp-up time [than Java does] for the average developer. Java eliminates a lot of headaches for developers." ■

Calico Stakes B-to-B E-Commerce Applications on Java

David Cardinal, CTO of Calico Commerce Inc., wouldn't consider building his company's Web applications with anything other than Java. Cardinal and his development team have standardized on Java 2 Enterprise Edition (J2EE) for productivity gains, among other things.

"We can develop applications much faster in Java," said Cardinal. "Compared to C++, I'd say we're gaining a 2-to-1 productivity increase."

Cardinal is hardly an advocate of C++; he considers the language a "hack" on top of C. Unlike C++, Java was designed from the ground up and is a better solution, he said.

Cardinal and his development team have been using Java since 1996. Back then, Java was not as well written as C++, he said. Further, executing applets in a browser did not work as well as everyone had hoped. Now, Cardinal said Java's functionality is "phenomenal," in regard to enterprise-level applications.

Despite Cardinal's enthusiasm about Java, he said it has drawbacks. For example, the graphical tool sets for Java aren't as robust as those for Windows, and the debugging tools are not as good (or pervasive) as C++'s. As a result, Calico Commerce (www.calicocommerce.com) is turning to companies like Rational and BEA that provide tools for developing robust Java applications.

"You have to decide what's the safest environment for in-house applications," he said. "We licensed WebLogic from BEA rather than just relying on J2EE. The Java Database Connectivity (JDBC) drivers are good in WebLogic, which is really important to us."

Calico Commerce is supporting both Solaris and Windows NT operating systems. In theory, the company's Java applications should run equally well on both platforms. In practice,



Calico's Cardinal says he's confident about the evolution of Java.

things are a little tougher.

"There's an industry political benefit to providing a cross-platform solution," he said. "If J2EE was Solaris-centric, it would be a proprietary platform. Microsoft's original position was to build a better Java than Sun, but at some point they stonewalled [Java], which makes it harder to do good Java work [for the Windows platform]. It's as if Java users are the enemy of the state. A better strategy would be to embrace and extend."

Cardinal is confident about the evolution of Java, given the broad industry support and the emergence of new and better tools. He has watched Java evolve from a "video-game operating system" to a server-side solution that has "taken off like a rocket."

"I'm really excited about Java," he said. "Because of Java, a lot of great ideas have been born." ■

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LINUXWORLD

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promoting Red Hat Linux, using joint marketing and channel recruitment with Red Hat.

IBM also is working with **TurboLinux Inc.** to deploy TurboLinux 6.1 on IBM's NetVista thin-client desktop systems, and with **MontaVista Software Inc.** to use its Hard Hat Linux as a deployment platform for IBM's Visual Age Micro Edition for embedded development. IBM will also bundle single-CD versions of SuSE Linux 7.0 with selected Netfinity servers sold in Europe through the end of the year.

In addition, the company disclosed that it had released its Omni Print Driver technology as open source, bringing nearly 100 new print drivers to the operating system, and also released its Dynamic Probes (dprobes) development tool as open source. According to IBM, Dynamic Probes is an automated kernel-level debugging tool that gathers diagnostic information and may be used to trigger other debugging facilities at crucial points of execution.

And how about an anti-alliance? **Corel Corp.** chose LinuxWorld to announce that Michael Cowpland resigned as the company's president, CEO and chairman of the board. The reason given was that Cowpland resigned in order to dedicate his time and resources to start-up opportunities, particularly in the open-source market.

The company's interim CEO and president will be Derek J. Burney, formerly executive vice president of engineering and CTO. Cowpland will retain his seat on Corel's board of directors.

IBM, of course, isn't the only company offering a Java Virtual Machine (JVM) for Linux; there's another company, based in Silicon Valley, that's also in that business. **Sun Microsystems Inc.** announced at the show that future versions of two of the leading Linux distributions, SuSE Linux and TurboLinux, will include Sun's Java 2 Standard Edition (J2SE) "Hot Spot" JVMs. Two other distributions, from Caldera and MandrakeSoft, already had agreements with Sun to include J2SE VMs with their products. Currently, J2SE version 1.3 for Linux is in beta testing, and according to Sun, is expected to be completed in October.

PLATFORMS

SuSE Linux AG was the first Linux provider to commit to support **Advanced Micro Devices Inc.**'s new 64-bit processor platform. AMD's new processor architecture, called x86-64, was announced in mid-August and is designed to run both 32-bit and 64-bit applications. According to SuSE, the first versions of gcc and binutils development tools have already been written by one of SuSE's developers.

SuSE's president, Volker Wiegand, presented the new port as

being representative of the company's strong cross-platform appeal; SuSE was demonstrating its Linux running on platforms ranging from ordinary x86 PCs to PowerPC-based Macintosh PCs and IBM S/390 mainframes at its booth. "SuSE is the only global IBM development platform," said Wiegand, adding that the company is even working on an AS/400 version of Linux.

"Not a single developer today can afford to ignore Linux," Wiegand said. "It's not the David anymore." But Linux isn't just for mainframes: The company showed off its new SuSE Linux 7.0 Personal Edition, targeted at ordinary desktop users at home and small offices. "Our focus isn't on desktop or server versions," he said, "but on who is going to use the product."

Debian Project released the long-awaited Debian GNU/Linux 2.2 operating system, based on the Linux 2.2.16 kernel. Available for x86, PowerPC, ARM, Alpha, Sparc, and 68030 processors, the new release features an improved installation procedure, as well as continued improvements to the apt package, which allows automatic upgrades of Debian and its packages from earlier versions.

Stormix Technologies Inc., one of the major distributors of the Debian GNU/Linux version of the operating system, has brought out Storm Linux 2000 Starter Edition. Based on version 2.2.16 of the Debian Linux kernel, and including StarOffice 5.2 and Netscape Communica-

tor 4.73, the \$19.99 home product marks a strong retail push by the company. The company also unveiled its Deluxe Edition, which replaces the now-discontinued Storm Linux Standard Edition introduced in January, and which includes both desktop and server applications.

New at LinuxWorld is the company's Storm Firewall, a network-security package aimed at small-business and home users. According to the company, the \$99.95 product is not currently certified by ICSA or other third-party testing firms, but the company is considering the certification. According to Stormix, the firewall package not only runs on Storm Linux, but also on Red Hat Linux 6.x.

Corel, too, released a Debian 2.2-based Linux at LinuxWorld, Corel Linux Second Edition. Corel Linux OS uses the KDE desktop. New features are glibc 2.1; support for Universal Serial Bus; and an IBM Java Virtual Machine.

TOOLS

It's totally RAD: **Data Representations Inc.** has updated its Simplicity for Java and Simplicity Professional to version 1.2.1. The rapid application development tool suite includes tools for allowing developers to build SQL queries graphically, using an ODBC/JDBC data source, and include the resulting data into the applications. The cross-platform version, Simplicity Professional, also now includes a new environment for building

Java Servlet-based network applications, and has automated tools for testing applications on multiple target operating systems. Simplicity for Java is priced at \$149 per developer seat; Simplicity Professional costs \$895.

Sleepycat Software Inc. has teamed with **MySQL AB** to release MaxSQL, an open-source transactional SQL server. SleepyCat is best known as the company commercializing, enhancing and supporting Berkeley DB, an embedded database engine. MySQL AB is the prime developer for the MySQL open-source database.

According to the companies, the new MaxSQL can handle databases up to 256TB in size. The new product combines MySQL's standards-based query language with Berkeley DB's transaction system, to provide a database that the companies characterize as "survivable," with the ability to handle power failures and system crashes without failure. MaxSQL is distributed under the GNU General Public License.

"What's keeping Linux from getting out of the back office is that there aren't end-user applications," said Brent Duncan, director of marketing for **Clean-scape Software International Inc.** The biggest reason, he said, is a lack of an integrated development environment for Linux programmers.

To that end, the start-up company, which acquired **IPT**

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LINUXWORLD

◀ continued from page 26

Corp. in 1999, will be integrating its line of C and FORTRAN source-code analyzers, ectype code generator, ATTOL test-automation suite, and qef build-management system. Those tools have already been ported to Linux. No date was set for the release of the product suite, but Duncan hinted that it might be this year.

And speaking of integrated development environments, what about **Inprise Corp.**'s Kylix project? It's in its third beta, and according to Inprise's Michael Swindell, director of product management, "Our target is to have it out before the end of the year."

Inprise also announced that it is licensing IBM's Developer Kit for Linux, Java 2, Standard Edition version 1.3, which is equivalent with Sun's Java 2 JDK 1.3 specification, according to Tony de la Lama, vice president and general manager of the company's Java Business Unit. The IBM developer kit will be used in the JBuilder, Application Server and VisiBroker applications, he said, and will be deployed on Linux, Solaris and Windows.

Trolltech AS, known as the developer of the Qt cross-platform C++ application framework, used LinuxWorld as the venue to demonstrate its new embedded Linux partnership with Lineo Inc., maker of the Embedix embedded Linux ker-

nel, as well as to preview its newest Qt release.

Leading Trolltech's charge down into the hardware is the new Qt/Embedded, a graphical application framework. According to the company, Qt/Embedded uses only 700K ROM, and because its graphics do not use the X Window system, it offers extra features on embedded platforms, such as anti-aliased text. The initial release will support MIPS, StrongARM and x86.

Along with the introduction of Qt/Embedded, Trolltech is working with Lineo to bundle its software with Lineo's Embedix Linux kernel and development environment.

Demonstrated at the show was Trolltech's Qt version 2.2, currently in beta test and available for download from the company's Web site (www.trolltech.com). According to the company, the new version includes a Windows 2000-compliant look and feel for its Win32 version; faster 2D graphics visualization; an XML parser with SAX (Simple API for XML) interface; and bundling of Qt Designer, a rapid-application GUI development tool.

EMBEDDED

LynuxWorks Inc. revealed plans to increase the integration of its two embedded operating systems, LynxOS and Blue Cat. Blue Cat is based on the Linux kernel and is licensed according to the GNU General Public License; LynxOS is Lynux-

Works' flagship operating system, and is a proprietary solution based heavily on Unix. According to Inder Singh, the company's chairman and CEO, Blue Cat is also the only Linux distribution from an ISO-9000 certified manufacturer.

New at the show was Blue-Cat Linux 3.0, which added a messaging API to the operating system, as well as memory sizing tools. A key improvement, said Singh, is its support for multiple-processor designs. Version 3 is priced at \$299 per developer seat.

Singh said that the company has no plans to phase out LynxOS in favor of Blue Cat. "Lynx is hard deterministic, has a smaller memory footprint, and is already qualified and certified by many developers," said Singh, emphasizing that although Blue Cat is an embeddable operating system, it does not include hard real-time functionality.

At present, the process of developing for Blue Cat and LynxOS is similar, with comparable tools. "We already provide cross-development tools on Linux workstations," said Singh, adding that the next release, expected in late 2000, will also provide binary compatibility for applications written for the two operating systems.

In addition, LynuxWorks announced that **Apogee Software Inc.**'s Aphelion programming environment for Java-based applications now supports LynxOS using the Pentium and PowerPC processors, and that support for

Blue Cat is promised before the end of 2000. Aphelion includes both Sun's PersonalJava and Embedded Java Virtual Machines.

LynuxWorks also showed Blue Cat running on new targets at the show, including Motorola's Pentium II-powered MBX2000 board, the ARM and StrongARM processors, and Hitachi's SuperH processors.

Adding new support and tools for its Linux/RT real-time version of the Linux operating system, **TimeSys Corp.** launched a new integrated development environment and unveiled new multi-processor support.

The key new feature of TimeSys' IDE, TimeWarp, is its support for round-trip design using the Unified Modeling Language. According to TimeSys' vice president for technology, Douglass Locke, TimeWarp was designed to provide integration for other TimeSys tools. The IDE runs on Windows workstations.

Lineo Inc., which makes the Embedix embedded Linux kernel, also announced an agreement with **VMWare Inc.**, maker of virtual machine software for x86 PCs running Windows and Linux.

The fruits of the agreement will be called the Embedix V-Kit, a single-disc Windows-based development environment that will use VMWare to create two Linux virtual machines. One VMWare VM will contain a bootable copy of Lineo's Linux distribution, along with its TargetWizard tool

for creating custom Linux deployment kernels, as well as Metrowerks Inc.'s Code Warrior, explained Paul Cameron, Lineo's director of engineering. The second VM will serve as the deployment target during development, and will initially include a sample embedded kernel that new developers can run, study and experiment with.

Lineo is targeting Embedix V-Kit at developers who are used to the Windows development environment, but who need to build embedded Linux systems—and don't want to lose the productive time to configure dual-boot systems, migrate their development environments to Linux or purchase a second PC, said Cameron. Plus, its ability to deliver x86 code fits into the company's broad vision of embedded systems. "Embedded systems don't have to be custom hardware using specialized processors," he said. "Embedded systems can be streamlined kernels and applications running on an old PC. You don't have to have customized hardware to get benefits from embedded Linux." Pricing for the V-Kit had not been set, and delivery is expected in the fourth quarter.

Lineo also released the beta of Embedix Real-Time, a development environment that the company claims offers hard real-time capabilities, including deterministic and bound scheduling, and interrupt latencies in the tens-of-microseconds range. The tool, also expected in the fourth quarter, will cost \$149. ■

LINUX DIRECTORY

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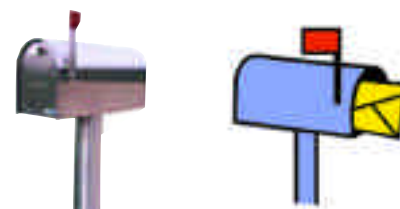
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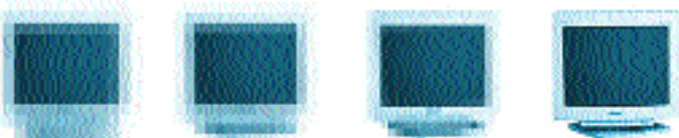
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THE C# MYSTERY HOUSE

At Microsoft, the only word being spoken in the development tools department is ".NET." As I commented in an earlier page of punditry, .NET sounds exciting but could easily succumb to Microsoft's long-standing practice of throwing out a proprietary curveball. As such, most of us cautious commentator types have left our verdicts at "interesting" with an option to freak out later when Redmond actually releases some substantive code.

Fortunately, Microsoft doesn't seem to be wasting any time implementing the new framework, and an early result is a preview of C#, Microsoft's newest bet for the hearts and minds of developers. Officially, Redmond is describing C# as just a new language derived from an updated and simplified C++ root structure. And sure, Microsoft hasn't linked C# directly to its Java-killing "Cool" initiative of a year and a half ago, but we must wonder how many C++-derivative programming languages one company can be working on simultaneously. Add to that Microsoft's recent cooling toward the Java platform in general, and you're quickly presented with an obvious question: Java or C#?

Officially, Redmond avoids the topic of Java entirely when discussing C#. According to Microsoft, C# aims solely at becoming an object-oriented and easier-to-use version of C++. The company's marketing

department is obviously hoping to convert its large Visual Basic audience over to C# by hinting at a very low learning curve with the end result of being able to access much of C++ power.

Of course, we've heard that "subset of C++" line before, namely when Java was first described—almost exactly the same bullet-pointed rhetoric concerning object orientation, increased ease of use and an architecture designed for distributed Web application development. Where Microsoft holds an advantage over Sun in this regard is that it already has a huge audience of Visual Basic developers who are primed and willing to take advantage of this new technology no matter how proprietary it might become. By promising these programmers additional power and flexibility as well as better performance than Java is currently perceived as providing, Microsoft is dangling a truly succulent carrot.

And the company has added a number of technical goodies to tempt developers even further, especially Visual Basic programmers. For one thing, C# is heavily optimized for writing component code by allowing programmers to quickly create COM objects, which are much easier to integrate into other applica-

tions because those programmers have roots in C++ rather than Java or Enterprise JavaBeans. For those who like C++, C# carries many of the same strengths, including support for pointers, primitive data types, preprocessor directives and multiple inheritance.

On the new feature front, Microsoft has also promised an upgraded version of RMI (Remote Method Invocation) that is language independent, but I wasn't able to get any specifics beyond that as yet. Even so, such a technology would allow C# developers to quickly write nearly platform-independent objects that could just as easily be turned into Web-based objects.

In addition, Microsoft is promising to flesh out C# with a number of other mature language enhancements, most notably automatic garbage collection and support for COM and the Windows API. But we should also be able to find type-safe support, variables that are automatically initialized and native support for versioning.

From a top-level view then, C# and Java are aimed at many of the same developers and mostly the same type of projects. But even though Microsoft is loudly trumpeting its new support for entirely open standards, many developers can't forget its attempt to subvert the Java community by sneaking Win32-proprietary features into Visual J++. But even with this predisposed crowd of

Microsoft haters, C# is still positioned as a very strong contender to Java, provided that its initial release lives up to all of Microsoft's promises.

By providing even Java (as well as C++ and Visual Basic) programmers with a language that is easy to use, fast and optimized for Web development with support for native code as well as the Win32 API, Microsoft has combined what many folks wanted to see out of C++ with exactly what many Java and VB folks wanted to get out of their languages. All in all, it's a very strong draw.

But how tightly is C# really integrated with Win32/64? No one yet knows. How much support is there for the language from third-party IDE and tool manufacturers? No one yet knows. Will Microsoft stop supporting both Java and Visual Basic in order to draw more mind share into C#? No one knows. Can and will Sun incorporate some of C#'s new features into upcoming Java standards? Look, no one has any idea.

All we do know is that C# is spec'ed out to be a powerful Web-oriented development tool and that it's being pushed by the most potent marketing arm in history with a penchant for competition and locking in its customers. Where are those beta CDs? ■

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WEBGLs

The canonical definition of an application server—"a tool that sits between the Web server and the database back end"—is singularly unsatisfying. It does nothing to explain why app servers range in price from free to tens of thousands of dollars per CPU, why an app server may bring critical capabilities to a development project, and why choosing an app server can lead to unexpected technological lock-in. That's why I prefer to refer to app servers as "WebGLs."

Programmers of a certain age remember when the tools used to build software systems were called "computer languages" and the languages were classified in terms of "generations." Machine code manipulated by panel switches constituted first-generation languages, macro assembly languages belonged to the second generation, and FORTRAN and other "high-level" languages the third. Each rung in this ladder increased the abstraction between the representation of the problem (the source code) and the mechanism by which the problem was solved (the actual operation of the computer).

Prognosticators such as James Martin conceived of two more generations: one in which processing was based on the invariant rules of E.F. Codd's relational data model, and a final generation in which the processes would be based on

the solution to artificial intelligence. Despite the "fifth generation" as one more over-reaching claim for artificial intelligence, this data-abstraction genealogy proved remarkably apt for understanding why relational-database-centric languages were so successful in the '70s and '80s. These fourth-generation languages (4GLs) ran rings, productivity-wise, around procedural languages when it came to building business apps.

Unfortunately, the data-model-centric 4GL programming model, which attached behavior to the manipulation of table, row and column data, didn't map into the interface-centric "event-based" model for programming graphical user interfaces, which attached behavior to the manipulation of window, widget and text representations. Also, the generational model did not capture the benefits of object-oriented programming, which provides powerful tools to abstract both data and process.

But the generational model *does* map well into the creation of Web applications. Web services are typically more centered on data flow than on user-interface manipulation. The success of XML is largely based on the removal of user-interface concerns from the realm of the software engineer. Just as 4GLs leveraged a model

of user interaction (user requests data; user edits data; user stores data), WebGLs have a similarly constrained model based on sessions, registration, the browser interface, *n*-tier architectures, and so forth. Just as 4GLs had wildly variant pricing, so too does the open-source Zope Web server project compare well against some of the most expensive tools. Finally, the col-

lapse of the 4GL industry has important lessons for app server vendors, managers and developers.

My definition of a WebGL goes beyond programming language syntax. One of the characteristics of a good WebGL is that it uses an established programming language (often Java, but everything from C++ to Perl are possibilities) rather than proprietary languages for which hiring and training are prohibitive. How much do you think it will cost you to hire a software project manager able to estimate costs for a scalable C# project and a system architect able to engineer it? While the .NET platform is the best move Microsoft has made in years, it will be several years before it becomes mature enough to be a serious contender.

The flip side of the coin is that while the programming language should not be proprietary, the benefits of a WebGL largely derive from its proprietary components: out-of-the-box frameworks for rapid development of your Web services. And, make no mistake, just-add-water-

e-commerce is still a myth for anything more involved than mom-and-pop retailing. So even if your WebGL is based on Java, for which there is a vast supply of training available, you'll most likely find yourself paying premium salaries for architects and experienced developers.

The final component to the WebGL value proposition is the development process. Several WebGLs have tools and processes that offer great support for either the construction phase (during which the behavior of the Web service is developed) or the evolution phase (during which content is created). Construction-phase tools include editors and debuggers, while evolution-phase tools include the white-hot area of content management tools.

One doesn't hear much about 4GLs anymore—proprietary languages, disastrous merger-and-acquisition choices and an inability to adjust to the changing market doomed the industry. When thinking about linking your livelihood to a WebGL, consider whether your WebGL vendor faces similar threats: lack of a developer base, incautious strategic alliances and the exploitation of XML. Those that can deal with these issues can be critical tools in the quest to develop advanced Web services. ■

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MIDDLEWARE IN, UNIX OUT

The odd little portion of the world that we work in became even odder in August when Caldera Systems bought SCO's Unix business. This rather perplexing deal has its roots in ancient history; that is, it predates the 1990s.

SCO, acronym for The Santa Cruz Operation, is a company that for years sold its version of Unix on Intel to small businesses that wanted multiuser systems running on a single PC. Typical clients included small, professional offices such as doctors, dentists and lawyers. Installations and support were performed by a dedicated channel of resellers that kept SCO growing for years.

The good times sort of ended when Windows NT debuted and terminal servers like those from Citrix became the fashion. SCO was not able to answer this incursion into its turf. The company made some efforts to reshape its operating system for the desktop during the mid-1990s, but ultimately decided it needed to push its product along more traditional server lines. So in the mid-1990s it bought UnixWare from Novell. UnixWare was an Intel version of Unix formed by a joint effort between Unix

Systems Labs (the cradle of Unix and at the time a division of AT&T) and Novell. The idea was that SCO would convert its user base to UnixWare—which had many technical aspects that were superior to SCO Unix—and then it would develop UnixWare into a full-fledged server operating system for Intel, complete with advanced multiprocessor support and the like. This latter effort, dubbed Gemini, obtained the backing of IBM. IBM's validation alone sent SCO's long-lagging stock zooming from around \$5 to nearly \$30. Even though SCO's financial performance was flat, the prospect of this operating system running on Intel's IA-64 architecture had distinct appeal to investors.

Appeal that tarnished suddenly when Linux took off. Overnight, when people were talking about Unix on Intel, they meant Linux. No one, and I mean no one, thought of SCO Unix, UnixWare or even Solaris on Intel (all of which can be bought today). They thought only Linux. SCO had missed its own train.

The nose dive in SCO's stock price was unstoppable, as was the decline in

revenue. Except in one division—the one that sold Tarantella, a product that SCO happened rather fortuitously to develop. Tarantella allows desktops to access applications hosted on a variety of servers, mainframes in particular. SCO has now become the company whose sole mission is to sell Tarantella, and in fact has renamed itself Tarantella Inc.

All Unix sales, support and development will be done by Caldera, a Utah company that has prided itself on its staunch defense of open-source systems: Linux primarily, but also DR-DOS, the venerable Digital Research clone of MS-DOS. DR-DOS, might seem a laughable asset, but so far it has proved a far bigger revenue generator for Caldera than Linux. This is because Caldera sued Microsoft for having blocked adoption of DR-DOS in the '80s and early '90s through a variety of machinations, including testing for DR-DOS in its original version of Windows and refusing to load if DR-DOS was found. Caldera won the suit for millions. But in fact, Caldera was sort of founded to be a thorn in Microsoft's side (first with open-source operating systems, then DR-DOS) since it was bankrolled

by Ray Noorda, the man who made Novell into, well, Novell. After which, Noorda brought the company to its knees in a quixotic bid to unseat Microsoft as the No. 1 software vendor. The campaign, dubbed Noorda's folly, involved buying WordPerfect to compete with Microsoft Word and buying Unix to go head-to-head with Windows NT. Novell lost the war and almost died as a result. Now Noorda's Caldera owns Unix. You see what I mean when I say odd?

Caldera cannot explain how it will merge the operating system lines or how it can still champion open source when it will keep UnixWare source code closed. SCO cannot explain how the operating system that is the bulk of its revenue is better off-loaded, while the company morphs itself into a "middleware" vendor. (And Novell—although here strictly by happenstance—is unable to explain what it is doing at all.) Perhaps not since the Iran-Iraq war can I recall two parties to one activity so incapable of explaining what they're doing or why. Watch for the bombs, or better yet, pass me the remote! ■

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MIDDLEWARE WATCH



ANDREW BINSTOCK

BRITNEY AND THE HACKERS

If my calculations are correct, I am now the last and only high-technology columnist to remain mum on the Napster controversy. Lesser writers, in this publication and every other, have yammered tirelessly—and cluelessly, as I shall demonstrate by and by—about the service, the users, copyright law, the recording industry and the vital role of creative artists in Western civilization. A blanket of tedious, mind-numbing verbiage has settled over the world as every two-bit pundit has felt obliged to have his say.

I had hoped to dodge the issue. The controversy has, after all, little or nothing to do with software development. My plan was to stick to substantive techie topics until the Napstergate brouhaha blew over. Alas, it is not to be. The cluetrain left the station with no passengers. And so, as a matter of public service, I shall untangle the legal knots and deliver up the last word on the subject. Along the way, you shall see that the issues behind Napster affect not just musicians and listeners, but software developers as well.

JUST THE FACTS

Napster is an Internet site that supports peer-to-peer sharing of music files in MP3 format. Napster users contribute music and download music contributed by others, much as developers contribute and download source code from open-source repositories. Although Napster's Web site warns users that

they must not violate copyright law, everyone admits that virtually all of the material traded and shared over the service is copyrighted.

Copyright holders, including musical artists and the Recording Industry Association of America, have sought legal assistance in shutting down Napster. They argue that when users download copyrighted music without paying for it, they are stealing. Multiple lawsuits have resulted in the imposition and lifting of an injunction against Napster. The legal wrangling could be settled at any time, but the underlying issues may take years to resolve.

The open-source community has demonstrated that its heart is in the right place but its head is stuffed with oat bran by supporting Napster's users. They argue that the music industry, like the software industry, would benefit from a new philosophy in which intellectual property is distributed freely.

EVERYBODY'S WRONG

I am surprised that programmers, of all people, dismiss the downloading of a few tunes as harmless. Musicians make their living the way we do, by selling licenses to use the products they create. Downloading a copy of the latest Britney Spears CD without paying for it is no different from ripping off a copy of Windows or Quicken.

The strongest legal argument in

Napster's arsenal is the claim that it is subject to a "common carrier" immunity from prosecution—the same immunity that prevents the government from prosecuting the phone company when criminals conspire, during a telephone conversation, to commit an illegal act. The courts have ruled that the phone company does not and cannot police the use of its service, and therefore cannot be prosecuted as a co-conspirator. It is not clear whether common carrier law can be stretched sufficiently to cover a service that is used primarily for illegal activities. What Napster is doing may not be illegal. But it's clearly wrong, just as those old-fashioned electronic bulletin board systems that distributed pirated software, or trafficked in copy-protection unlock codes, were wrong, too.

The RIAA is wrong, too. The recording industry is understandably fighting to protect its highly profitable position as middleman between artists and consumers. But the Internet is all about reducing the role of middlemen. If the RIAA shuts down Napster, a thousand clone sites will replace it. Inevitably, technology will loosen the RIAA's stranglehold on the production and distribution of musical works.

WHY PROGRAMMERS SHOULD CARE

Currently, U.S. copyright law serves creators of intellectual property—Metallica and Madonna and thee and me—in two ways. It establishes authorship and ownership of the work. And it establishes a

means by which creators can earn a living—by licensing limited rights, such as the right to publish, duplicate and sell the work.

We need to split copyright law into two parts, separating ownership from compensation. European copyright law can serve as a model, as it already recognizes a "moral" copyright, which gives creators a nontransferable, permanent interest in their work, separate from the licensable publishing rights.

The second provision of copyright is unworkable in the Digital Age. We need to find a new way for artists and programmers to earn a living from their work, beyond merely selling licenses to it (the conventional model) or giving it away for free and selling support services (the open-source model).

We could collect a portion of an electronic distribution system's advertising revenues, say. Or we could become shareholders in a distribution system and work for equity and profits. Heck, we could start a Napsterlike service for distributing software. There are countless ways for us content creators to support ourselves besides direct revenue from the sale of licenses. It's not clear which alternative will prevail, but it's dead certain there will be new legislation sooner or later.

And whatever the new laws say, we—and our unlikely comrade Britney Spears—will have to live with them. ■

J.D. Hildebrand is the former editor of such publications as Computer Language, Unix Review and Windows Tech Journal. Reach him at jdh@sdtimes.com.

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TROUBLE ON PARADISE ISLAND?

Everyone knows the story of the last company that made buggy whips. It was a giant among businesses after acquiring or destroying its competition, and so very attractive to investors. The future seemed certain, until a man named Henry Ford came along and changed the way we got around. Before too long, the company that made buggy whips had lost almost everything, surviving only due to small sects such as the Pennsylvania Dutch, who didn't see progress as a good thing.

The parable rings just as true today, as Programmer's Paradise, the once-dominant mail-order vendor of shrink-wrapped software development tools, finds its market share dwindling and its stock price plummeting as new advances in technology render its primary business model, the mail-order catalog, largely obsolete.

When the client/server paradigm dominated computing, Programmer's Paradise was huge, representing almost 50 percent of all packaged software sales in the development market, according to Jim Duggan, vice president and research area director at industry analyst Gartner Group. It had acquired several of its biggest competitors and had a peak stock price of \$17 on Feb. 1, 1999.

But a series of events has transpired to put the squeeze on Paradise. First, there are a lot fewer of the high-volume packages that carried the company's

business. As an example, Duggan said that in 1997, the company's catalog featured eight to 10 pages of Sybase products. Today, PowerBuilder is a mere shadow of the business it was, according to Duggan, and replacement products haven't been coming in.

Second, the number of medium-sized tool companies is going down, Duggan said, citing consolidation in virtually every category of packaged software.

But perhaps the most damaging blow has been the expansion of the Internet and the introduction of broadband communications.

Now, developers won't hesitate to download a 10MB package over a broadband connection. Direct fulfillment from the software manufacturer and downloading thousand-dollar software packages have largely replaced the retail channel. And with the ease and ubiquity of software, more and more manufacturers are giving it away free and making money off support.

"The low costs took the heart out of their business," Duggan said. This does not even touch on the fact that more and more individual programmers are shifting to the open-source area, where applications are available with source code as free downloads.

Programmer's Paradise, though, is clinging to its whips. CEO Bill Willett is bemused by the company's stock price woes, saying the company has no debt and substantial cash on hand. While acknowledging that the company disappointed investors

last year because of earnings forecasts that were way off the mark, he blamed the poor performance on its European operation due to the Y2K lockdown abroad. Programmer's Paradise, Willett said, has an agreement with European consulting firm PC Ware to purchase the European part of the business.

He also said he sees a shift in the business, as individuals buying with credit cards are being replaced by purchase orders from businesses looking for enterprisewide packages.

The company will focus on customer service, ensuring that any software purchased will be on the customer's desk at 10:30 the next morning, which for many developers, Willett said, is good enough.

On the positive side, he explained, are the strong brand recognition and the fact that the company has devoted significant resources to improving its Internet sales and delivery systems.

Willett said the worldwide development tools market is \$34 billion, with the U.S. accounting for \$15 billion. Programmer's Paradise, he said, does \$100 million in the U.S. "The opportunity to grow is enormous," Willett said.

As for the open-source community and its free software? Willett said, "I don't think it will have a significant impact in the market."

That may well prove true. However, it just as well could be what the owner of the last buggy whip company remarked when asked if he believed motor coaches would become widely adopted. ■

David Rubinstein is executive editor of SD Times.

MONEY WATCH



DAVID RUBINSTEIN

ON THE INSIDE

Sun Microsystems Inc. and Rational Software Inc. reported excellent second-quarter results, driving up their stock prices. So it's only natural for company insiders to indulge themselves in a little profit-taking (or, in some cases, a lot of profit-taking).

At Sun, vice president Marc Loupe sold 10,000 shares on July 31 at \$100.50 per share. Vice president Stephen T. McGowan sold 22,000 shares between July 26 and July 28 at an average price of about \$106 per share. Senior vice president Janpieter Scheerder sold 128,000 shares on July 26 to July 27 at about \$108 per share, and executive vice president John S. McFarlane sold 18,000 shares on July 27 at \$109. President Edward Zander sold 100,000 shares on July 26 at \$106.50 per share, while senior vice president William T. Agnello sold 99,200 shares on July 26 at \$105.09 per share, vice president James Judson sold 10,000 shares on July 26 at \$107.77 per share, and executive

vice president Michael E. Lehman sold 112,000 shares on July 26 at \$106.50 per share.

At Rational, CEO Michael T. Devlin bought 199,405 option-related shares at about \$17 per share and sold them at about \$103 on July 17 to July 26. Senior vice president Dean A. Leffingwell sold 25,000 shares on July 24 at \$102.83 per share, and senior vice president David H. Bernstein sold 44,000 shares on July 20 at \$104.94 after option-related buys at about \$17. Vice president Eric L. Schurr made option-related purchases of 26,111 shares at about \$10.50 per share and sold them at \$106.94 on July 13 to July 20, while president Thomas F. Bogan bought 20,000 option-related shares at about \$11.25 and sold them at \$102.98 on July 18, and senior vice president James McGee made option-related purchases of 18,645 shares at between \$7.61 and \$52.31 per share, to sell them at \$106.06 on July 17.

STOCK WATCH

\$2 BILLION-PLUS

Company	Symbol	Close 8/25	Market Cap. (billions)	Shares Out (millions)
Microsoft	MSFT	70 3/4	372.3	5,262
Oracle	ORCL	85 3/16	241.8	2,838
Sun Microsystems	SUNW	125 9/16	199.7	1,586
SAP	SAP	62 9/16	78.6	732
BEA Systems	BEAS	59 3/8	22.2	375
Computer Associates	CA	29 1/8	17.2	591
Rational Software	RATL	112 3/8	10.5	93
Broadvision	BVSN	30 9/16	8.1	250
PeopleSoft	PSFT	27 3/8	7.6	280
BMC Software	BMCS	25 5/8	6.3	247
Citrix Systems	CTXS	23	4.3	186
Red Hat	RHAT	24 1/8	3.8	157
Cognos	COGN	39 7/8	3.5	87
Network Associates	NETA	23 5/32	3.1	139
Symantec	SYMC	49 1/16	2.9	61
Compuware	CPWR	8 1/8	2.9	364
RSA Security	RSAS	61	2.4	39

\$2 BILLION - \$500 MILLION

Company	Symbol	Close 8/25	Market Cap. (millions)	Shares Out (millions)
Serena Software	SRNA	40 7/8	1,606	39.28
Entrust	ENTU	25 7/16	1,589	62.46
Iona Technologies	IONA	73 1/4	1,551	20.45
Informix	IFMX	5 5/32	1,464	280.4
Allaire	ALLR	37 7/8	1,032	27.25
Legato Systems	LGTO	10 15/16	951	86.96
ILog	ILOG	48 1/8	731	15.2
Axent Technologies	AXNT	24 1/16	696	28.81
SilverStream Software	SSSW	31 1/4	640	20.25
Baan	BAANF	2 15/32	519	242.4
Rainbow Technologies	RNBO	41	515	12.5

UNDER \$500 MILLION

Company	Symbol	Close 8/25	Market Cap. (millions)	Shares Out (millions)
Marimba	MRBA	16 1/8	377	23.43
MapInfo	MAPS	39	362	9.31
Inprise	INPR	5 11/16	349	61.20
Starbase	SBAS	6 15/16	322	46.55
Persistence Software	PRSW	16 1/4	317	19.51
Saga Systems	AGS	10 1/4	298	29.36
Brio Technology	BRIO	10 7/16	294	28.23
Cysive	CYSV	8 1/32	224	27.72
Merant	MRNT	7 1/8	212	29.86
Excelon	EXLN	7 1/32	207	29.40
Viador	VIAD	9 3/16	163	17.81
Be	BEOS	4 1/2	163	35.86
Digital River	DRIV	6 5/8	144	21.90
EarthWeb	EWBX	13 11/16	142	10.41
Centura Software	CNTR	3 5/16	140	39.00
Santa Cruz Operation	SCOC	3 3/4	134	35.81
Attunity	SISG	12 5/8	121	8.42
Alladin	ALDN	9 29/32	112	11.39
Rogue Wave Software	RWAV	7 1/16	76	10.81
Unify	UNFYE	3 15/16	72	18.39
Fatbrain.com	FATB	3 7/8	50	13.00
Gensym	GNSM	3 3/4	23	6.33
Programmer's Paradise	PROG	3 3/16	16	5.21

UPSPRING

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Fortune 1,000, on developers with mission-critical embedded applications and on independent software developers," added Boes. "Developers in midsize and smaller companies were telling us, 'We don't want to

implement your technology on an enterprise scale, but for smaller teams.' So, we've repackaged the Discover applications on a smaller scale."

The CodeRover applications are slimmed-down versions of the Discover applications, said Boes. An initial family of eight applications is planned, with

the first three shipping this month, three in October, and the final two by the end of the year. "Discover is for teams," said Boes, "and CodeRover is designed to improve individual developers' productivity."

The first three products out of the CodeRover chute will be called Browser, Integrity and

Caliper. "Browser is a source navigator and editor," said Boes, comparing the product to Wind River's Sniff. Browser, with the ability to parse macros and inset code in different languages, as well as integrate into popular integrated development environments, will be priced at \$595 per seat, with a

\$195 introductory price.

Boes described the \$595 Integrity as an enhanced Lint, designed to analyze newly written source code not only for syntactical and ANSI compatibility, but also for what he described as "more than 160 industry-accepted programming rules." The result, he said, is that Integrity can identify problems such as potential memory leaks.

The final tool, Caliper, analyzes and produces a quality-assessment report, identifying areas where source code varies from UpSpring's list of programming rules. Caliper is similar to UpSpring's QA Cockpit service, which analyzes existing masses of source code, but is designed to be used during the project's initial coding phase, said Boes. "Where Browser and Integrity would be used by the individual programmers, Caliper would be used by the team leader," he said.

The other five products in the CodeRover family will be targeted at such diverse applications as impact analysis, change analysis, project management, C/C++ header analysis and the identification of dormant code. Those products will be priced from \$595 to \$1,995, said Boes.

The CodeRover suite runs on HP-UX, Irix, Solaris and 32-bit Windows, said Boes.

CodeRover supports C/C++, Java and SQL development, and is integrated into Microsoft's Visual Studio suite on Windows, and Rational's ClearMake development environment on Unix. ■

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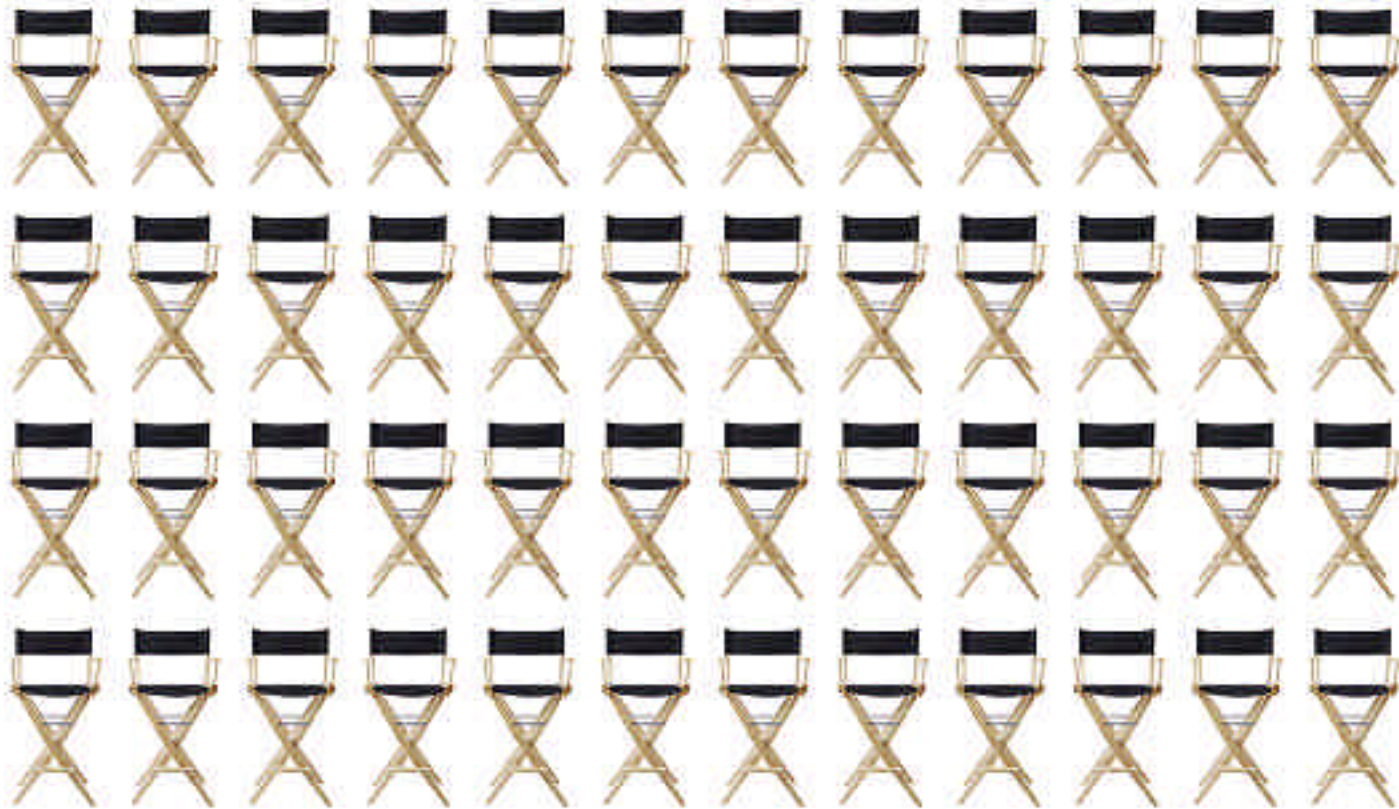
INPRISE

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code. Also enhanced will be SQLBuilder, its integrated visual SQL query-building tools, which will incorporate a JDataStore 100% Pure Java embedded database development license.

General availability of JBuilder 4, which will include Linux, Solaris and Windows versions in a single box, is scheduled for the end of this month. The Professional edition, which will include Internet beans, JSP/Servlet and database development tools, will be priced at \$999. The \$2,999 Enterprise edition will add repository and other team collaborative capabilities plus EJB development features and will sell for \$2,999. An entry-level Foundation edition will include an editor, compiler and debugger and can be downloaded for free at www.borland.com/downloads. ■

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